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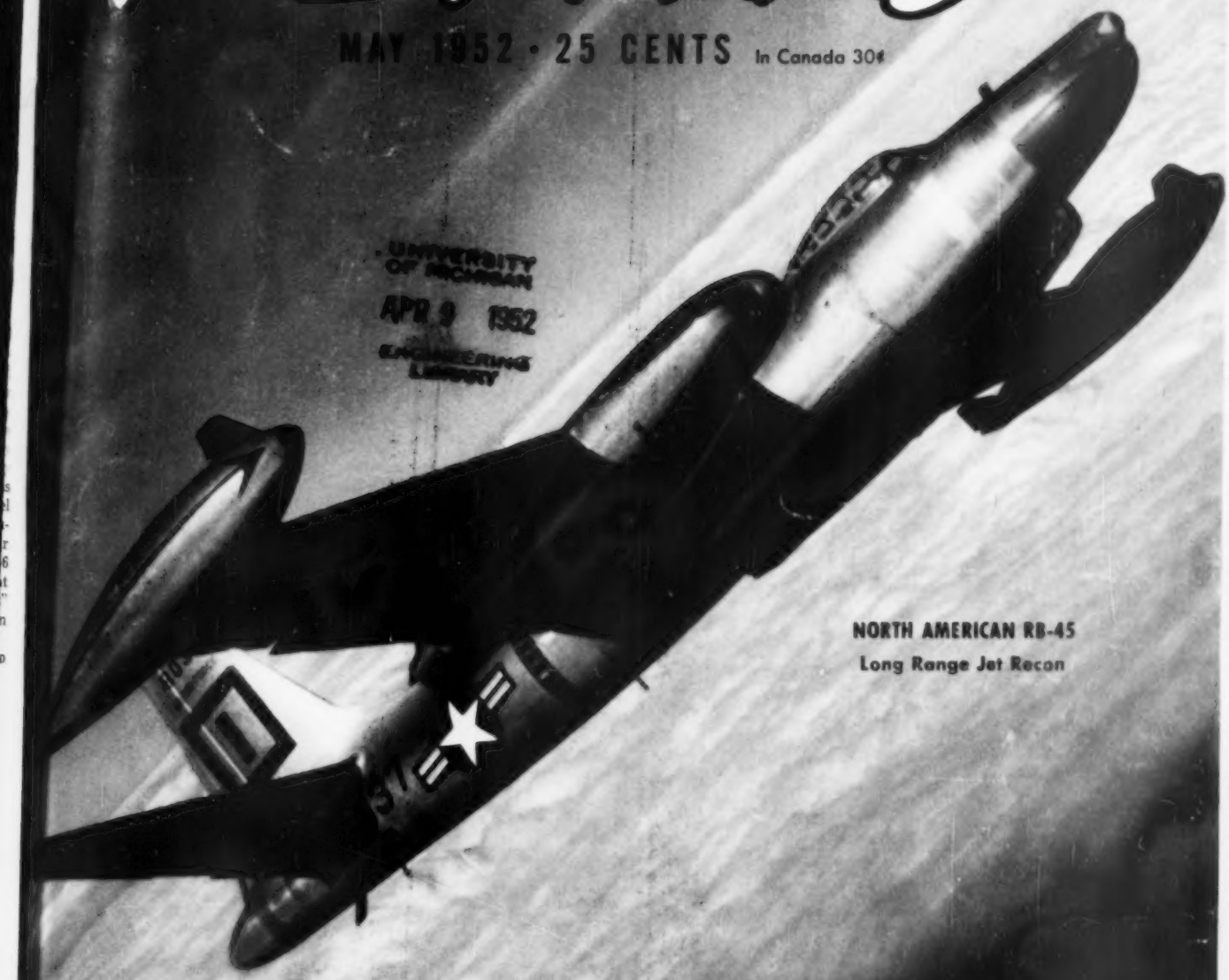

NORTH AMERICAN RB-45
Long Range Jet Recon

Wild Life From Aloft PAGE 20

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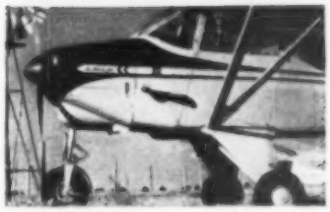

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FLYING's FAMILY

What does it take to pilot the editor's desk at FLYING Magazine? The hands at the controls presently belong to Gill Robb Wilson, whose check-out over the years has included: 35 years as a pilot . . . 18 years in military service . . . 13 years as State Aviation Director . . . eight years as newspaperman . . . war correspondent . . . first chairman of the American Legion's Aeronautics Committee . . . co-founder of AOPA and AOPA Member #1 . . . past president of the National Association of State Aviation officials . . . founder of the Civil Air Patrol . . . consultant to the CAA . . . consultant to the U.S. Air Force . . . owner of numerous personal aircraft over the years . . . Q.B. . . . past president of the Wings Club . . . member of the Congressional Aviation Policy Board . . . traveller to the ends of the earth . . . etc., etc., etc.

• • •

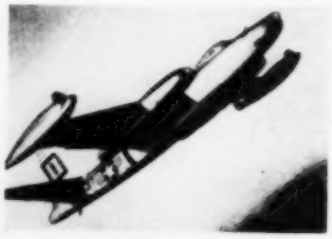
Like a good many other officers in the inactive Reserve, Bob Parke ("Arctic Sentinel", p. 16) maintained only a nodding acquaintance with the Air Force in the five years between his discharge in 1946 and his recall in 1951. In those years he was mainly concerned with his job in the promotion department of the Campbell Soup Co. in Philadelphia. When the containment policy of the U.S. was challenged and the situation in Korea developed, Bob suspected that his 1,500 pilot hours in B-17s and C-54s might look good to the Air Force. He was right. He was recalled and, after a period of re-indoctrination, was making the polar flights described in "Arctic Sentinel". After completing a year of his second hitch, Bob received a medical discharge and now has a job with Brenon and Morgan, New York public relations firm.

BOB PARKE

• • •

Charles E. Planck ("Taking the Cross out of Cross Winds", p. 18), the Chief of the Current Information Division in the CAA's Office of Aviation Information, has been keeping the public aviation-conscious for 29 years. In 1923, he originated the column "Sky Traffic" in the Detroit Free Press. He handled public relations for a number of airlines and aircraft companies before journeying to Washington to introduce instrument landing developments. He's been with the CAA since 1940. In addition to being a private pilot, he is author of "Women With Wings" and numerous magazine articles on aviation subjects.

C.E. PLANCK



THE COVER: Long Range Jet Recon North American RB-45

FLYING

Reg. U. S. Pat. Off.

MAY, 1952 VOLUME 50, NUMBER 5

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Editorial and Executive Offices, 366 Madison Ave., New York 17, N. Y.
Branch Offices: 185 N. Wabash, Chicago 1, Ill.; 815 S. Hill St., Los Angeles 14, Calif.

FLYING is published monthly by the Ziff-Davis Publishing Company at 185 N. Wabash Ave., Chicago 1, Illinois. Entered as second-class matter Sept. 8, 1942, at the Post Office, Chicago, Ill., under the act of March 3, 1879. Entered as second-class matter at the Post Office Department, Ottawa, Canada. *Postmaster—please return undelivered copies under form 3579 to 64 E. Lake St., Chicago 1, Ill.*

SUBSCRIPTION RATES: U.S., Canada, Mexico, South and Central America and U.S. Possessions, $3.00 for twelve issues; in British Empire, $4.00; all other foreign countries, $4.00 for twelve issues. SUBSCRIPTION SERVICE: All communications concerning subscriptions should be addressed to Circulation Dept., 64 E. Lake St., Chicago 1, Ill. Subscribers should allow at least two weeks for change of address.

CONTRIBUTIONS: Contributors are advised to retain a copy of their manuscripts and illustrations. Contributions should be mailed to the New York Editorial Office and must be accompanied by return postage. Contributions will be handled with reasonable care, but this magazine assumes no responsibility for their safety. Any copy accepted is subject to whatever adaptations and revisions are necessary to meet the requirements of this publication. Payment covers all author's, contributor's and contestant's rights, title, and interest in and to the material accepted and will be made at our current rates upon acceptance. All photos and drawings will be considered as part of the material purchased.

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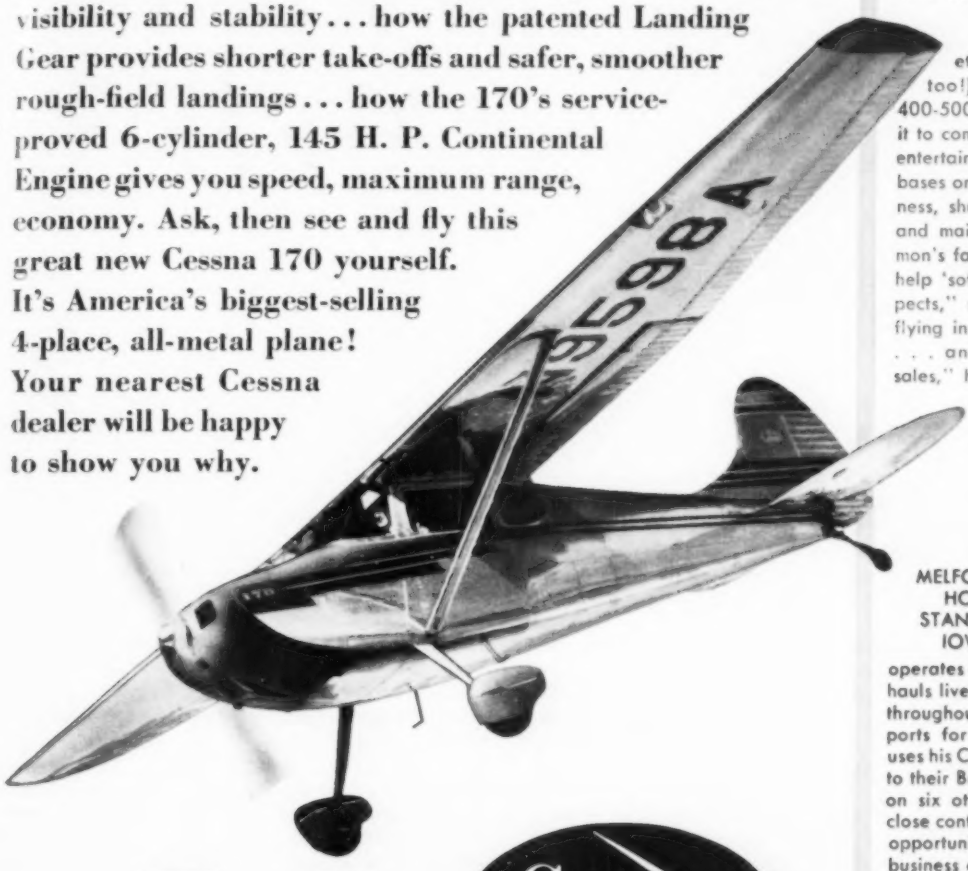

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CESSNA CASE HISTORIES

ENGINEER

VERNE SIEMON, ST. CHARLES, ILLINOIS, owns an engineering firm that builds small motors for electronic devices, aircraft, jig saws, etc. He and his wife (she flies, too!) pilot their Cessna 170, 400-500 hours a year; say they use it to commute from home to office, entertain prospects, fly to Air Force bases on government contract business, shuttle out-of-town customers and mail from the airport to Siemon's factory. "Short Cessna hops help 'soften-up' many of my prospects," says Siemon. "They enjoy flying in my 170 as much as I do . . . and it frequently leads to sales," he adds.

TRUCKER

MELFORD A. HOVE, STANHOPE, IOWA, operates a 16-truck freight line that hauls livestock and farm machinery throughout the Midwest. He transports for Sears Roebuck; says he uses his Cessna 170 for service calls to their Bradley, Ill., plant; for calls on six other shippers, to maintain close contact with livestock shipping opportunities in Chicago, solicit new business and visit a favorite fishing hole in Hayward, Wisconsin. The 8-hour auto trip to Chicago, Hove flies in 2½ hours. He reports that he is continually finding new business uses for his Cessna 170, says "a larger plane would cost us too much to own and operate, while a smaller plane wouldn't give us the passenger capacity or stability in the air. That's why we like the 170. It's perfect for our type of operation!"

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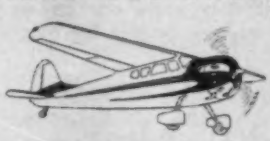

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FLYING
VOLUME 50, NO. 5
MAY, 1952

AN EDITORIAL

The Word is SAFETY

It is not true that the customer is always right but it is true that the man with something to sell must always be right with the customer.

Aviation is one of the most salable packages of all time. Even the school boy knows that the future belongs to the nations and peoples which mature fastest and most broadly in the tools and procedures of the air age.

We know something else. It is that American aviation can mature only in an atmosphere of public approval and sympathetic understanding.

The future of the United States, as well as the progress of aviation, depends largely upon the citizen and the airman marching hand in hand toward the goal of honest self interest—basically the law of self preservation. The word for it is "safety."

When science and industry moved our living standards from the horse and buggy to the mechanical vehicle, and from the blacksmith shop to the production line, they also complicated our safety. The automobile alone has slain a million Americans.

Better living, bigger opportunity, greater freedom—these are not all beer and skittles. Progress has a price. No pay, no progress. It is as simple as that.

By virtue of the very nature of flight the matter of air safety has been an all-absorbing subject within aviation. No development in all time has spent so much of its capital and energy to assure safety as has organized aviation. Statistically, safety in proportion to activity, the effort has been crowned with success.

If aviation were the clothing business, the statistics would carry conviction. But it isn't. It is a revolutionary human experience, dynamic and colorful, and always in the white light of public attention. Its triumphs and tragedies are alike notable. Nor so long as less than twenty-five percent of our citizens have ever been aboard an airplane will aviation become a prosaic, matter-of-fact business.

Maybe we do not like this but facts are facts and must be faced. And in face of this fact, our safety statistics are blown out the window by every unhappy crack-up to hit the headlines.

Therefore we can never afford to be satisfied with anything less than perfect safety—not safety as compared to early railroading or to present automobile safety—but safety comparable only to perfection.

To attain this perfection we must continually re-evaluate everything that is basic to aviation—planes, airports, instruments, pilots, regulations, procedures. There must be no sacred cows. It belittles nothing of magnificent achievement to ask designers and engineers for ever greater safety factors in aircraft. It points no finger to ask government what premiums it has hung up for airline expenditures for safety research.

It implies nothing to ask for analysis of the relations of pilot unions and company management in the question of pilot competence. Nor is it any castigation of personal plane owners and private pilots to ask how thorough their knowledge and how sound their judgment in proportion to their activities. It implies no lack of conscience to question the allocation of air routes, the political considerations of government aviation policies, and the nature of procurement contracts.

Air safety is not a matter of reformation. American aviation is not eaten by any great cancers. Forced by the demands of two great wars to seek ever greater aircraft performance, it has contrived relatively phenomenal safety.

On the other hand this relative safety can only be perfected by an honest discontent with anything less than perfection. Nor should the subject be hid under a bushel. The American people are not children. They are contemptuous of secretiveness. They are appreciative of intellectual honesty. They will laugh with us and cry with us and be one with us if they know our triumphs are earned and our tragedies happen despite the best we can do en route to perfection.

Gill Robb Wilson

Gill Robb Wilson
Editor & Publisher

A LOST AIR POLICY

Gen. Carl A. Spaatz

General Carl A. Spaatz, whom General Eisenhower called the greatest air strategist in history, flew combat in World War I, commanded the American strategic forces in Europe in World War II and, more than any other individual, authored the doctrine of American air power. Retiring as the first Chief of Staff of the Air Force in 1948, General Spaatz presently contributes much of his time to the youth of the nation and in particular to the Cadet Program of the Civil Air Patrol.

By GEN. CARL A. SPAATZ, USAF (Ret)

I HAVE READ Gill Robb Wilson's March editorial in FLYING—"What Has Happened to America's Youth?"—with much of the same nostalgia that the editor felt in writing it, I'm sure. "Has American aviation lost the American boy?" "Can air power survive without youth?"

"In chasing the flickering light of a brave free world, have we crowded the youngster out of the sky?"

I have repeated Mr. Wilson for emphasis to whatever remarks I might lend his editorial—perhaps the most thought-provoking commentary on aviation that I have read in the postwar period. I should like to point out that the FLYING editorial is, in my opinion, a *professionally conservative appraisal* of an alarming situation taking place on a national scale and *not* a play for effect. Like the editor, I have lived an air career of approximately the same years and have observed the same trends in this nation's 48 years of shaping its aviation . . . I share in his concern.

There have been times, such as in the early 1920s and again during the late '30s, when I began to despair of our air strength and the public's will to support air power. But never—until 1946-47—did I become concerned about our *youth in this Air Age.*

This realization came to me during the late part of my service in the U.S. Air Force, as Chief of Staff. We began to experience difficulty in filling even small quotas for Aviation Cadet classes—an unheard-of condition heretofore. The Air Arm had just finished a monumental task of training almost a quarter million pilots during the period 1940 through VJ-Day. All had been eager in the best of flying cadet traditions.

And then we could not get applications. What had happened? *Where was the failure?*

In building a global air force, thousands of acres of air bases, 350,000 military airplanes and a quarter million military pilots, some phases of our air strength had to suffer. That fate fell to the youth, the boys and girls of World War II, whose interests in aviation went wanting for leadership and direction. These thousands of young people came into the postwar period with little interest in what we thought to be a new air age.

Our total air mobilization had been too busy winning a global war.

That situation never can be quite corrected. I would like to think that every American boy and girl who had a spark of airman in him has been given a chance to realize his ambition. These young people of World War II have now outgrown what I call the golden age in the making of an aviator—the 'teens.

This air nation, if it is to remain in that category, must

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Gill Robb Wilson

Gill Robb Wilson
Editor & Publisher

A LOST AGES SSING

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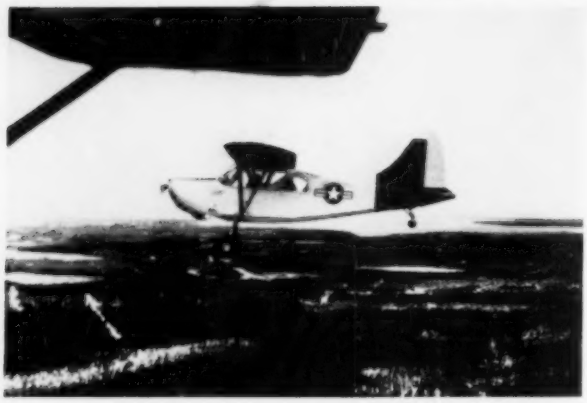

An L-5 type aircraft, owned and flown by the Civil Air Patrol, flies an artillery spotting mission for Alaskan Ground Forces.

Overseas representatives to the International Cadet Exchange join in a handshake while in the U.S. as guests of the CAP.

Gear-laden girls debark from plane after flying into Robins Air Force Base in Georgia for a summer encampment of the CAP.

never again let a generation pass without opening its know-how to every American boy and girl. More important still, our airmen must take a personal interest in the boy who has a flair for the air.

We would have had no Lindbergh, no Earhart, had not some perhaps obscure airman taken each of these greats under his wing for early inspiration.

Other forces, of course, contributed to the big slump in postwar aviation, as pointed up so well by Mr. Wilson—a national economy that skyrocketed and forced new thousands from realizing an air dream.

I see a new hope for our lost air policy on youth in a national aviation program that happens to be quite close to my present activities. Shortly after retiring from active Air Force service I became chairman of Civil Air Patrol's National Executive Board. Although this was my first active interest in the Patrol, I had been fully aware of the organization since its inception in 1941. I recall, too, that Mr. Wilson was one of the founders.

Along with the capable leadership of Maj. Gen. Lucas V. Beau, USAF, CAP National Commander, the National Executive Board set upon the task of shaping a grass roots program in the Patrol and for all civil aviation in the U.S., if it cared to share in the plan.

Basic to this program was *youth*, a trained body of CAP cadets to reach a goal of 100,000 in a long-range project. The cadets were not new to the organization in 1948, but we determined that this area of CAP would be stressed. In any event the CAP cadet plan would provide a continuing means by which young people 15 to 18 years of age could train in the basics of aviation.

We explored and opened an international project. This gave Civil Air Patrol and its friends abroad the annual International Cadet Exchange and International Drill Competition.

The present strength of nearly 45,000 CAP cadets in 1,400 Flights and Squadrons attests, I believe, to the soundness of stressing the *boy* and *girl* in Civil Air Patrol, if not in *all civil aviation*. The thousands of CAP seniors —men and women alike—have given of their time and talents selflessly during these four years to provide trained, mature leadership.

Also, through the CAP seniors, the cadet shares in a vast pool of resources, namely the 4,500 member-owned lightplanes and the professional skill of some 12,000 member-flyers.

We have neither expected nor achieved startling results in building a young air citizenry. Pioneering seldom moves that way. As an illustration of CAP activity aside from unit work on wing, group, squadron and flight levels, we have had a "CAP High School Coordinated Program" since 1949. This program places the CAP Aviation Study Manual in the secondary schools as a part of the curriculum. It is, in my opinion, the best available general aviation education plan for secondary school systems. Yet we have succeeded in placing the program in less than 250 high schools of the many States and Territories.

But, we are making headway—visible progress with a program *in being* and not just a paper project. Only 15 years ago it was virtually impossible for a high school student to acquire a thorough orientation into aviation in school life.

The two international programs of the Patrol are a great story in themselves. For purposes here let it suffice to say that the International Cadet Exchange and drill competition have given a representative body of CAP cadets each year an insight into life and aviation abroad. While youths from overseas are here in the United States as guests of CAP units, our Exchange cadets visit the many participating countries.

As one of the results of four (*Continued on page* 48)

The Civil Air Patrol, official auxiliary of the U.S. Air Force, is made up of 52 wings covering the 48 States, the District of Columbia, Alaska, Hawaii and Puerto Rico. Boys and girls, aged 15 to 18, enlist in the Cadet program where their activities include encampments at the various air force bases, national and international drill competitions bringing together crack drill units from the U.S., Canada and England, and weekly squadron meetings in which cadets receive classroom instruction in navigation, meteorology, theory of flight and other aviation subjects. On week ends at their local airports they receive Link trainer orientation, cockpit familiarization, rifle instruction, aircraft maintenance training and go up for familiarization flights in light aircraft. Outstanding cadets from the various wings are chosen annually to represent the U.S. in the 14 foreign countries participating in the International Cadet Exchange.

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WOMEN and the Nation's Security

The Armed Services are paging 72,000 more women for active duty. The need is great. The time is NOW.

Corp. Barbara Sperry labels contour lines on a transparent weather map at Andrews Air Force Base near Washington.

Lucille A. Dasbach, Parachute Rigger at Naval Air Station, San Diego, has kept survival equipment shipshape for 7 years.

By BETTY RYAN WOLFE

Member of FLYING Staff

THE YOUNG WOMEN of America are a critical question mark in the pattern of our national security today.

Do they have what it takes to stand as partners in the nation's defense?

Will they see their chance and make the most of it?

The next few months will tell the story. Military requirements of the Department of Defense call for the recruiting of 72,000 additional women volunteers by June 30, 1952. There simply aren't enough men available to safeguard the country's security.

And why shouldn't the women have a stake in upholding the way of life in which they believe? What's wrong with the 8,500,000 young women in this country between the ages of 18 and 34 who are healthy, well educated, unmarried and without dependents? Robert A. Lovett, Secretary of Defense, calls them "our greatest untapped source of humanpower." The tapping season is on, right now.

Since aviation is highly technical and involves many skills for which women are especially qualified, the subject of women in service is of exceptionally vital importance to air power.

Military service for women, shoulder to shoulder with men, is a Twentieth Century concept, made necessary by the times in which we live. General Marshall has stated that the United States must look ahead to a period of from 10 to 20 years of critical tension, if it is lucky. Women are today, and must continue to be, an essential part of the armed services, in sufficient numbers to alleviate the very real manpower shortage.

Aboard a MATS C-54 ferrying an air evacuation medical crew from San Francisco to Tokyo, Ensign Mary E. Taylor, Navy Flight Nurse, is briefed on flight plan by Air Force Captain Howard M. Coffin. Flight nurses are in great demand by Air Force and Navy.

The woman who responds to the nation's military call is neither replacing a man nor releasing a man for combat duty. She is doing a job for which she is suited and trained—any one of 500 different essential jobs now being performed effectively by women in service.

Nor are glory and inner satisfaction the only rewards for this service. In an economy where double pay standards sometimes prevail, military service is one occupational field where the law decrees that women and men must receive equal pay for equal performance of duties, as well as equal opportunity for advancement.

Prior to World War II there was a fairly common feeling among military men that if women had to be admitted to the armed services their assignments should at least be limited to four traditional categories—clerks, stenographers, telephone operators and cooks. The big war exploded that idea. Women proved their outstanding ability in tens and scores of jobs, and that was only the beginning.

In 1948, "The Women's Armed Services Integration Act," popularly known as Public Law 625, was signed by President Truman. For the first time in U. S. history, career opportunities for women were opened up in the regular peacetime Army, Navy, Air Force and Marine Corps. At present 40,000 women are serving in the Wac, WAVES, WAF, Women Marines, the Nurse Corps of the Army, Navy and Air Force, and the Army and Air Force Women's Medical Specialist Corps.

The broad field of aviation offers hundreds of interesting specialized jobs to air-minded young women. In the Air Force alone, members of the WAF are handling 446 specific jobs, and handling them at least as well as men could.

It would be hard to improve, for instance, on the record of Sergeant Eileen Shoemaker, brown-haired and green-eyed, who at the ripe age of 23 is Senior Control Tower Operator at Maxwell Air Force Base in Alabama.

Eileen was 18 and had done a few months of general office work in her home town of Garrettsville, Ohio, when she enlisted in the WAF in 1948. Assigned to Lackland Air Force Base in Texas for basic training, Eileen was then sent to Scott AFB in Illinois as a member of the first class of WAFs to go through Control Tower Operators School.

Sgt. Shoemaker was on duty in the Maxwell tower a recent evening as two F-84 jets were returning from Offut AFB, Nebraska, to their base at Turner AFB, Georgia. In the cockpits were Col. David Schilling, CO of the 31st Fighter Wing and winner of the 1951 Harmon International Air Trophy, and Lt. Col. William D. Dunham.

Cruising at an altitude of 36,000 (*Continued on page* 48)

In control tower at Maxwell Air Force Base, Sgt. Eileen Shoemaker helped guide two jet pilots to an emergency landing.

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THE OHIO PROJECT

By ED HOADLEY

FLYING's CHECK PILOT

EDITOR'S NOTE

This series of articles is planned to help the pilot and prospective plane owner evaluate aircraft now on the market. Authors evaluate each aircraft through the eyes of the average private pilot who flies a plane for business or recreation.

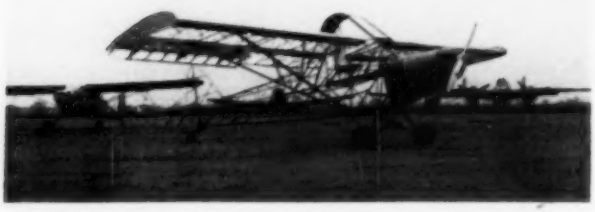
The "Ohio Project" Airplane—there she stands. A cooperative undertaking, the plane is a brand new item of farm equipment.

IN COLUMBUS, OHIO, finishing touches are being put on what might be termed a "brotherhood" airplane. A regiment of individuals and firms have volunteered ideas, parts, materials and services. From CAA officials to local mechanics everyone has collaborated yet nobody really owns the aircraft. In fact it doesn't even have a name.

Unveiled for the Ohio—Indiana Agricultural Aviation conference in February, the plane is merely called the *Ohio Project*.

It is an entirely new farm implement being built exclusively for farm uses in spraying, dusting, fertilizing, seeding and fungiciding.

Six features stand out in the machine: 1) extreme ruggedness of the "turn-over" structure which protects the pilot; 2) elevation of the pilot seat resulting in splendid visibility yet retaining high-wing stability; 3) spill plates or "splates" on each wing tip, resulting in less drag, higher speeds and lift; 4) beefed-up pilots seat; 5) latest type Air Associates shoulder harness; 6) cabin arrangement for pilot comfort and safety.



Agricultural spraying, dusting, fertilizing and seeding will be efficiently handled from the cockpit of the "Ohio Project."

Ohio Project is a direct result of the flying laboratory, the AG-1, developed at College Station, Texas, under auspices of CAA and directed by Fred Weicke.

The AG-1 was engineered from scratch to meet requirements agreed upon by professional dusters and sprayers. They desired slow, stable flight with heavy load, maneuverability in climb and turn, good visibility and easy loading.

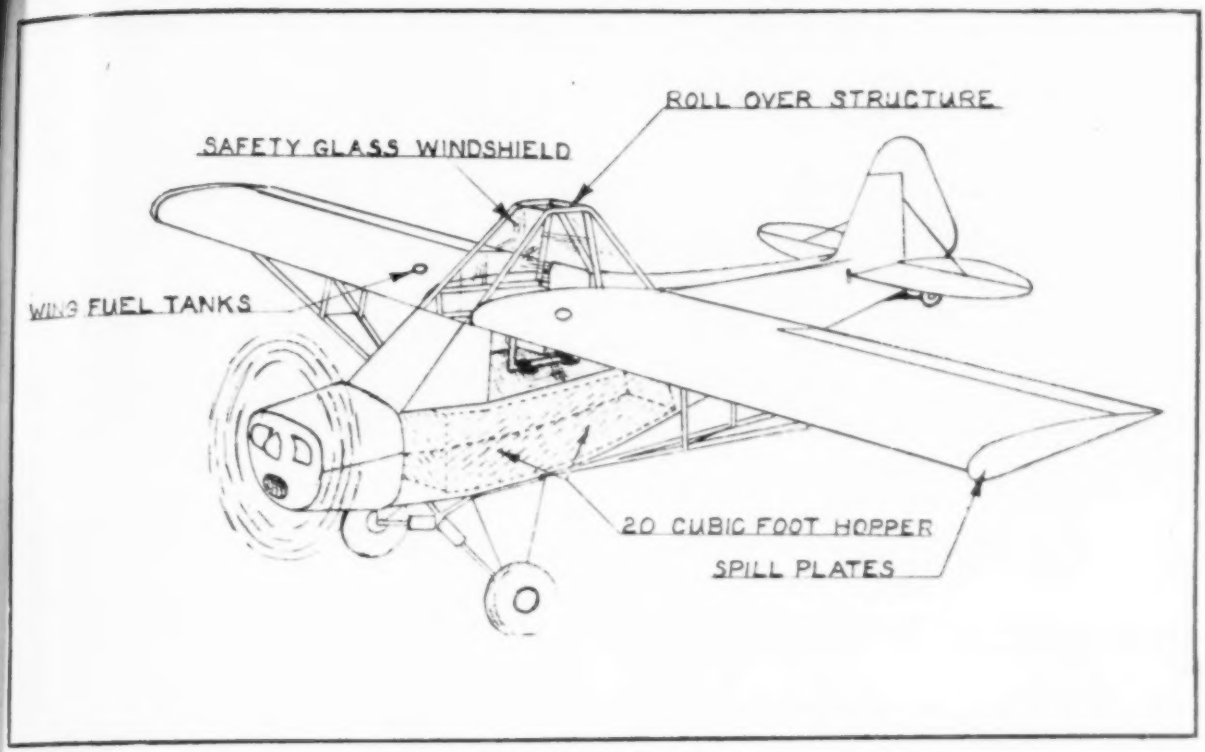
The Texas project succeeded in meeting all these requirements in a measure. However, the AG-1 was pointed at certain mandatory performance for agricultural work and did not seek to go beyond the fundamentals. No more AG-1's are being planned at this time.

The *Ohio Project* on the other hand is being built to include the developments represented by the Texas ship but to go beyond the fundamentals of performance and make possible some practical economies as well.

In essence the *Ohio Project* plane is a J-3 *Cub*, of which model there is an abundant supply in the land. When the *OP* is finally approved any A & E can take the Cub and with the blue prints of the *Ohio Project* turn it into a true applicator.

To create the *OP* five feet are lopped from the span of the J-3 *Cub* wing. Fuselage length is the same except that a 108hp Lycoming cowl replaces the conventional *Cub* cowl.

The "turn-over" structure, which rides two feet above the wing chord line, ties into the top longerons and is of $1^1/_8$ inch chrome molybdenum steel tubing. Nine tubes are designed to protect the head and a dozen more to shield the pilot's body. Solex Duplate safety glass forms the front windshield and extends around the entire cabin. The glass is tinted to solve the problem of glare.



OHIO PROJECT AIRPLANE

Visibility is exceptional. From my seat on top of this plane I had 360 degrees horizontal visibility and sight was limited vertically only by the steel headplate and the *Cub* wing below.

In line with engineering on the AG-1, the *Ohio Project* places the hopper load below the pilot. This prevents the old squeeze play in case of accident—you in the middle between the engine and the hopper. To help preserve the pilot's handsome features the instrument panel is located in the V of the top longeron diagonals down between his knees and a shoulder harness with 4,275 lbs. rating is used. The harness is anchored to the rear cabin bay at three points.

The Crash Injury Research Bureau of Cornell University has advised on positioning appurtenances about the cabin. Even the stick is so placed that it cannot impale the pilot.

The hopper shape resembles a bent coffin, six feet long, two feet wide and 18 inches high. It contains up to 20 cubic feet of solid or about 150 gallons of material. The lid is located at the old J-3 door position and is easily accessible to ground personnel. The *OP* is covered with fire-resistant butyrate dope, as on the *Pacer*. Color will be determined by the donor of the dope. The belly has detachable metal plates, as on the PA-18A, to facilitate cleaning and inspection. Otherwise the fuselage is conventional with standard landing gear and tail group.

Wings of J-3 origin with 35B airfoil section have splates. Each wing contains an 18-gal. tank. Stalls are engineered at 40 mph, with characteristics reaching toward the performance of the PA-18A agricultural plane. Lift struts are of J-3 type, but are reinforced at the butts with a heavy triangular sheet steel plate of 4130 type. This is a good idea for all J-3's. The control system is all Piper's with the exception of aileron bell-cranks by Aeronca.

125 HORSES

On the nose of the *Ohio Project* is a Lycoming 235-C engine which normally develops 100 hp at 2,600 rpm. First, they converted this to 108 hp by addition of a ram jet, changing of the timing, and installation of a special sea-plane McCauley "kliptip" Met-L-Prop. By continued tinkering, the engine has been made to produce 125 hp at 2,600, static.

As to methods of dusting application, special venturi and gates of new design will be used. The spray rig will be operated with an engine-driven pump rather than the less efficient slip-stream fan. Another feature will be the solenoid actuation of dust and spray controls.

How did this "for free" project come into being? The National Flying Farmers Foundation first proposed the AG-1 but at the same time the Ohio Flying Farmers were milling a special airplane in their collective minds. Ralph Young of the Ohio Aviation Board became interested in 1951. He met with a group in September of that year and a working committee was appointed. The committee consisted of Charles Kellenbarger, Herbert Haugh, Felix Sanduski, and Young.

COOPERATIVE PROJECT

There was no money available for the project contemplated. This did not stop the Committee. Piper Aircraft contributed the fuselage, an engine, and a lot of J-3 and PA-18 parts. CAA contributed two engineers, one safety agent, and complete drawings of the AG-1. Cornell donated the results of their exhaustive safety research. McCauley gave the propeller and the U.S. Department of Agriculture provided a wealth of know-how.

Fourteen different industries (*Continued on page* 46)

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ARCTIC SENTINEL

To the Danes and the Eskimos in the vicinity of 76 32' N, 68 40' W, Knud Rasmussen's trading post is pronounced "Thoola." Americans give it a bit of a brogue. It's "Tooley" to them.

By ROBERT B. PARKE

THULE, ARCTIC OUTPOST of the Western Hemisphere on the northwestern tip of Greenland, promises, in better days, to be an important link when civil air commerce crosses the top of the world.

Product of a year-long Arctic airlift, surpassing the tonnage carried by the Berlin Airlift, Thule already is transformed from a bleak trading post to a well-populated and effective air terminal. With a 10,000-foot runway, adequate housing and recreation areas, this new air sentry of the north has been created through the joint efforts of the United States Army, Navy and Air Force.

In 1910, Knud Rasmussen, the Danish explorer, pitched his camp 700 miles north of the Arctic Circle and christened the tiny base "Thule"—legendary last land on earth. In an air age there is no longer any "last land on earth."

Within the past 12 months an emergency landing strip near Rasmussen's Thule, leveled off during World War II, has been expanded into a runway capable of handling our largest planes. Nearby are heated hangars, permanent barracks and huge storage tanks. In the short space of one year the little trading post has mushroomed into a giant airbase that is also Greenland's largest city.

Air strips dotting the eastern fringe of Canada and the west coast of Greenland, quiet since the war, have been activated again as vital stepping stones en route to Thule. At the lonely airfields with the colorful names—Bluie West One and Bluie West Eight in Greenland and Crystal One and Two in Canada—an unending stream of C-54's land, take on fuel for plane and crew, then roar off again, heading north.

For the Military Air Transport Service crews who make the flight to Thule, Westover Air Force Base in Massachusetts is the home field. From here the route runs along Airways to Goose Bay, Labrador. Weather usually dictates whether the route from here lies through Crystal Two at Frobisher Bay and across Baffin Island or, more often, northeast out of Goose to Bluie West Eight about halfway up the coast of Greenland. From B.W. 8 to Thule the course is over the edge of the forbidding Greenland Ice Cap, famous for some of the worst weather and most rugged terrain in the world.

The first MATS planes assigned to the 3,000-mile run to Thule took off from Westover in the spring of 1951. The men who were to set up shop shared cargo quarters with Nissen huts, rations and drums of gas. At first the major problem was to get enough gas to Thule to assure the safe return of the planes. Progress seemed slow, when each aircraft arriving at Thule filled its tanks for the return flight from the gasoline drums it had just flown in.

Gradually the fuel reserve was built up and the cargo manifests began to read like the inventories of a combination hardware and grocery store—nuts and bolts and nails and tools, canned goods by the ton and sacks of potatoes and frozen meats. Truck and bulldozer parts were high on the priority list.

In the wake of the housing, food and machines, the workmen began to arrive. These men, mostly from the northwestern United States, were experts with the huge bulldozers, steam shovels and 10-wheel trucks they had learned to use back in Washington, Idaho, Colorado and Montana. Lured by a pay scale more than double the hourly wage for similar work in the States, these hardy workmen were happy to acclimate themselves to the rigors of the north. The work shift called for 12 hours on, 12 hours off, but there were compensations. With deductions for food and clothing, the average pay was over $800 a month.

An Arctic wilderness just one year ago, the U.S. base at Thule is now Greenland's largest metropolis.

Rugged, forbidding terrain of northern Greenland puts a premium on precise air navigation in the neighborhood of Thule.

By early summer the schedule of flights out of Westover stood at seven a day, with one flight in seven flown by the Navy squadron based at the field. Housing facilities at Thule were adequate and the food was good. On arrival, each crew—three pilots, two navigators, two engineers and two radiomen—was assigned to a heated hut with the assurance of at least an eight-hour layover.

By August, 1951, when the Navy had pushed a fleet of merchant ships through the ice-studded waters to Thule, the base was well started. Even so, the heavy equipment and prefabricated housing brought aboard the ships were a welcome sight. Soon hangars, storage facilities and comfortable barracks stood alongside Nissen huts on the skyline rising above the brownish shale of the coastal plateau.

The climate and topography of northern Greenland made the building of the giant base a formidable undertaking. Nine-tenths of this largest island in the world is covered by a vast ice cap which rises in places to more than 10,000 feet. Although the narrow coastal area is mostly free of snow, the pressure of the ice cap forces countless glaciers to flow down steep ravines to the sea. In the spring huge masses of ice break off to become the icebergs that clog surrounding waters. Except for about six weeks in late summer, ordinary merchant ships cannot navigate here safely.

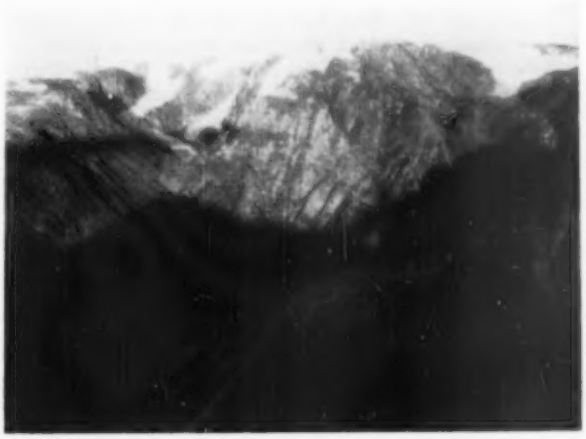
The three-month period of polar night that starts in mid-November seriously hampers outdoor construction. As the sun drops below the equator on its swing south it leaves all Greenland above the Arctic Circle in perpetual darkness. By early spring, the sun shows up for a few hours every day and gradually works its way back to the "midnight sun" condition, when the sun never sets. Around-the-clock daylight lasts for about three months before the days begin to shorten again.

For the flight crews, northern Greenland is a constant challenge. The finest analysts of Arctic weather cannot plot the violent and unpredictable frontal conditions. Storms accompanied by severe icing and strong, variable winds upset the best calculations.

For example, one plane flew out its estimated time of arrival to B.W. 8 without being able to get an absolute fix in the six-hour crossing from Goose Bay. Although B.W. 8 has a beam, the signal is frequently lost in the swirling clouds around the steep cliffs adjoining the field.

The pilot could raise only a confused signal from the beam and finally decided to let (*Continued on page* 62)

The operations shack at Thule welcomes a continual stream of flight crews clad in uniforms of the Army, Navy and Air Force.



Glacial masses, nudged down through ravines to the sea by the pressure of the Ice Cap, break off to form the icebergs that are a major hazard in surface navigation to and from Thule.

Taking the CROSS out of CROSSwinds

JOHN H. GEISSE

Carrying its own answer to landing wind problems gives the airplane independence and utility otherwise denied.

By CHARLES E. PLANCK

SIMPLICITY, low cost, safety and utility.

All those men who disturb the status quo in aviation have battled for these four qualities in our airplanes, and it is no surprise to see a product of the disturbing John H. Geisse trademarked with the same words.

The Geisse crosswind landing gear is simplicity itself. It is available for about one-third the cost of others. It makes today's airplanes almost foolproof in landings even by novices. And it adds more utility to the private plane than any other single accessory thus far invented.

When you see the Geisse gear boxed and ready for you on dealers' shelves it will be in a package smaller than today's midget radio receivers. There is a small bit of metal, hardly bigger than the pilot's fist, for each wheel. On the proper type of landing gear, the owner can take out four bolts, put the crosswind element on and put the bolts back in, as simply as he might install a clock on the dash.

When you see the gear in action, you'll shudder at what a pilot can do to an airplane without turning it into a cartwheel, or at least wiping out a few hundred dollars worth of wingtip. When finally, as it must come, the day arrives when all planes have such gear, and one-runway airports are the rule instead of the exception, then, at that time, the name Geisse ought to be remembered.

In the Geisse gear, either wheel may caster outward but not inward. This seems complicated and impossible but it is firmly based in aerodynamics and physical forces. In simple words, the weight of the plane on the upwind wheel—the one that would turn inward in a crosswind landing—is so slight as to be negligible. Most of the weight both on take-off and landing is on the castering wheel that is downwind. This arrangement makes it possible to use the simplest of mechanisms, and the simple mechanism makes it possible for Geisse to sell his plan for one third of the cost of the only other gear on the market.

A demonstration by Geisse is something to watch. When he was with the Civil Aeronautics Administration in charge of the program for developing crosswind gears, a principal difficulty was finding a runway with a crosswind for convincing demonstrations. Such winds are still awkwardly placed about the map and throughout the days. You can't find one when you want it. So Geisse, piloting the Cessna 140 which has had his gear installed since October, 1951, has cooked up his own still air demonstration.

He lands the plane in a slip, while pilots watching on the ground shudder. He taxis in fast figure eights, skittering the plane about a grassy field in turns that would roll it up in a ball without the castering gear. He takes off like a comedy pilot at the air races, swishing the tail

from side to side violently while the wheels caster obligingly. At the end of such a demonstration he always points out that after all, he is not a good pilot. His flying, he says, is rough, not the finished kind which most pilots can perform. Some pilots have urged him never to change his style of flying, at least while he is demonstrating the crosswind gear.

In the eights the speed and sharpness of the turns are sufficient to make the castered wheel turn out between 20 and 30 degrees, equivalent to landings with corresponding drift angles. Pilots are always impressed with the fact that a reversal of the turn requires only a very light application of the brake on the castered wheel. All pilots who have flown the plane are amazed at the perfect control while taxiing, lack of this control being one criticism that has been leveled at the gear which the CAA developed.

The strongest crosswind thus far available in the Geisse demonstration has been about 20 miles an hour, and landings were made at 90 degrees to this wind. They appeared to be no different from landings into the wind. The plane assumed a sufficient yaw into the wind on take-off so that very little correction was required for drift after breakaway. This happened without any attempt to get this condition. By deliberately taking off on the downwind wheel, the yaw can be made equal to the drift so that no correction is required.

The remarkable performance has been accomplished by providing a caster mechanism in which application of the brake on the downwind wheel—or the outside wheel in a fast turn—tends to increase the amount of caster. This not only provides an anti-ground-looping moment due to the increased drag of this wheel, but it simultaneously reduces the ground looping moment itself by increasing the degree of caster. In other types of crosswind gear, brakes decreased the amount of caster or had no effect upon it at all.

Essentially, the gear mechanism is no more than a hinge. One leaf of the hinge, comprising two members, bolts to the strut. The other leaf, also of two members, bolts to the wheel axle. A small pin immediately to the rear of the hinge pin prevents the wheel from castering inward while permitting it to nose outward as much as 30 degrees. The hinge pin is two inches ahead of the axle centerline, and this gives the caster effect.

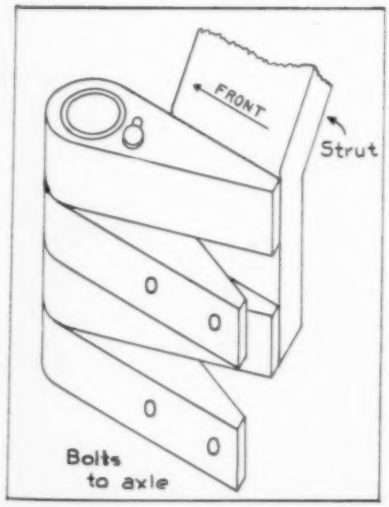
The hinge pin is sloped fore and aft so that the weight of the airplane tends to hold the wheel against the inward castering stop. If the hinge pin were vertical, the drag of the wheel would cause it to turn out. Thus the sloping pin tends to keep the wheels centered when castering is not desired.

The amount of side force on the tire or the amount of braking required to cause the wheel to turn out can be made any desirable value by proper choice of the amount the wheel is back of the hinge pin, the amount it is outboard of the pin, and the slope of the hinge pin.

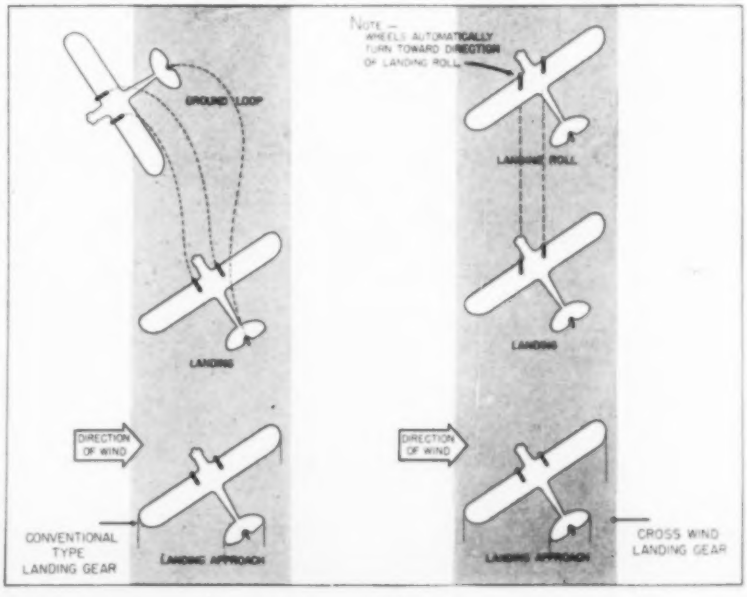
The hinge pin on the Cessna 140 has a slope of only 4.5 degrees in the tail-high position and this appears to be about right for the two inches of trail and five inches offset of the wheel. With this small slope in the tail-high position it is possible that the wheels might toe out slightly with full application of the brakes. The effect here would be to increase the effectiveness of the brakes, and the wheels would straighten out as soon as the brakes were eased.

Seeing a Geisse demonstration, pilots have immediately asked about tire wear, due to the skidding of the downwind wheel. New tires were put on the plane with the gear to measure wear. They have yet to show signs of wear through 100 take-offs and landings, and Geisse believes tire wear might be less than with fixed wheels. Most of the gears on small planes provide for the wheels to spread during the landing impact. Castering wheels permit this and thus help absorb the landing shock. The tires skid only on the rebound and this acts like a rebound snubber. The result is a softer landing.

A similar gear was applied to tricycle landing gear on an Ercoupe during the CAA program with excellent results. Since no ground loop control is required on such a plane, the main service of the castered gear was to reduce the tendency of the plane to roll laterally when landed in a substantial drift. The castering (*Continued on page 57*)



Three-quarter Rear View of Left Hinge—
GEISSGEAR



The plane's shadow plays "Tag" with a moose in the snow below as the annual winter census of big game is made from the air.

Idaho enjoys its distinction as the "Unspoiled State". Aerial game patrols help preserve its wild life.

PLANE TALK

ALL AIRMEN are sportsmen—hunters, fishermen, photographers, campers, skiers, or just plain out-of-doors folk who like to feel wind on their face.

It's a part of flying, personal flying that is, to get over spots not easily accessible otherwise. And among the most interesting of things one may see with a bit of planning is the wild life . . . and not always so wild as might be supposed.

A big moose with his nose buried in a lily pond in Newfoundland—a pelican who flew formation with me down in Florida, a band of antelope scurrying across the plain in Wyoming, a pair of deer heading for a swamp in South Jersey—nothing spectacular but just pictures to remember, pictures you would never see except from upstairs.

It's a good feeling to know the airplane is helping to preserve the wild life. Conquest of the country destroyed so much of it, some with good reason and some with no reasoning at all, that present conservation can be considered a mite of atonement to Mother Nature.

FLYING would like to hear from pilots whose flying experience has brought them in touch with the wild creatures—to their joy or sorrow.

The pictures here were all taken in Idaho, where the Fish and Game Department uses the airplane to range the primitive areas of the State as a vital tool in its conservation program.

—C. L. Hamilton

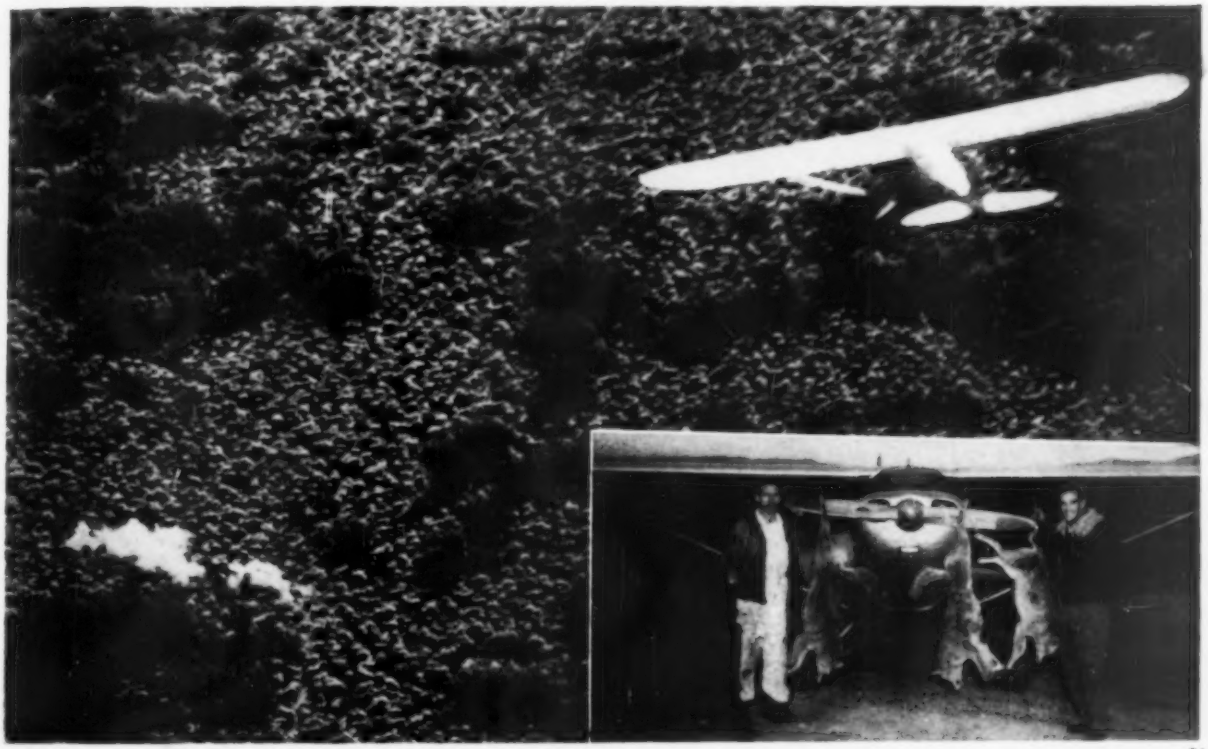
In a stream of spray, fingerling trout are released from an airborne tank to stock one of Idaho's remote mountain lakes.

Beavers are valuable in woods and mountains where they help slow water runoff. A pair of furry engineers drop by 'chute.

Wild whistling swans, rare in America, are plane-herded away from waters polluted by poisons from mines of northern Idaho.

from the IDAHO HILLS

The coyote, a predatory marauder, is hunted by crack shots in a low-flying plane. The insert shows hunters and quarry.



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They call it TAC

Contrary to the popular belief, ground support is not the primary mission of our tactical aviation.

By JAMES L. H. PECK

THE THUNDERJET leader chants into his microphone: "Steamboat this is Baby Doll."

His headphones crackle, "Baby Doll, this is Steamboat Control. Request number of aircraft, type and load."

"Roger, Steamboat Control. This is Baby Doll. Eight Fox eighty fours with napalm, rockets, and fifty calibers. Have you target for me?"

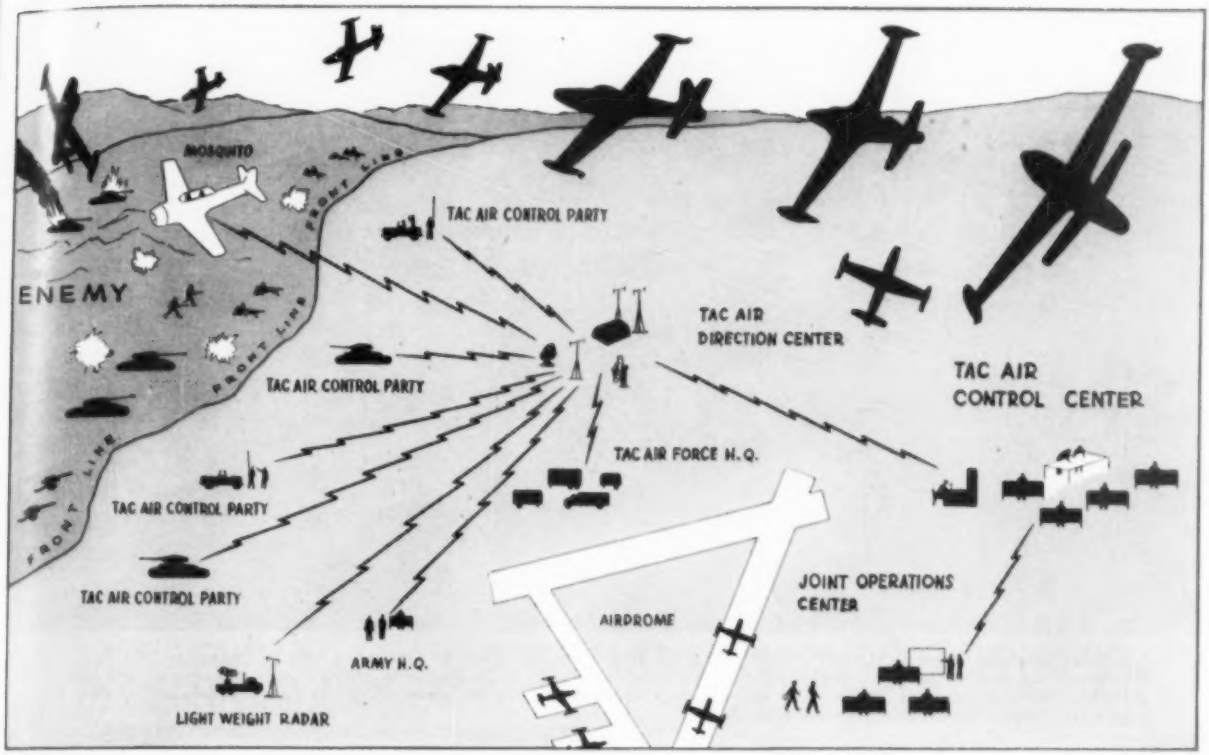
"Roger, Baby Doll. Report four aircraft to Ranger Contractor three zero, vicinity of Tare Easy eight zero four niner. Understand. Report other four aircraft to Parapilot Giraffe, vicinity of Tare Fox eight zero three six. Request strike results both flights when you check out of the areas. Over and out."

This is the new language of Tac—the spectacular, bat-out-of-hell brand of flying that is costing the Korean and Chinese Reds their shirts. These airmen get right down to business by operating at tree-top altitude, and business is booming. Strike results show that Tac has caused some 47 per cent of all Red troop casualties, knocked out 53 per cent of the enemy's locomotives and rolling stock, accounted for 72 per cent of all enemy artillery destroyed, 75 per cent of the tanks destroyed, and 81 per cent of all enemy trucks destroyed.

These statistics in Far East Air Force headquarters do not reveal that more than one F-80C or F-84E has come home from a train-busting mission with parts of a locomotive imbedded in the fuselage. It is not unusual for Tac planes to bring back such souvenirs as leaves and parts of branches in the air intakes, accumulated during a strafing mission or while beating up an enemy airdrome. Some have landed with a chunk of telephone pole wedged into the leading edge of a wing. This down-to-earth approach exacts a high toll. Sometimes telephone poles do not break off.

Strike results are gained the hard way. Take the caper that got the late Capt. Richard G. Bull of Central Valley, N. Y., the Distinguished Flying Cross—a little tunnelling job of boring from within. The vital tunnel below Pyongyang had to be knocked out in the early phase of "Operation Strangle." This target was a long passage hewn out of a mountain of rock, with sheer cliffs towering more than 600 feet above either entrance. The B-26 light bombers couldn't plant bombs close enough to collapse the entrances. They ruined the tracks, but the Reds had the roadbed repaired a couple of days later. Fighter-bombers could not come in close enough to dive- or skip-bomb and pull up in time to avoid crashing into the cliffs. One guy tried and didn't make it. Then Dick Bull, ex-jet instructor at Andrews AFB, got his F-80C off with two heavy Tiny Tim rockets aboard. Nobody was quite sure how the Shooting Star would behave with these big 1280-pound rockets. Other jets had shown a tendency to "tuck under" after releasing Tims, and this would mean a delay —perhaps a fatal one—in making the pull-up to miss the cliff.

Dick got off the runway easily by using JATO. With the target in sight, he went down on a dry run to get the feel of his aim and pull-up. A train started out of the tunnel. The engineer saw the plane coming down. He



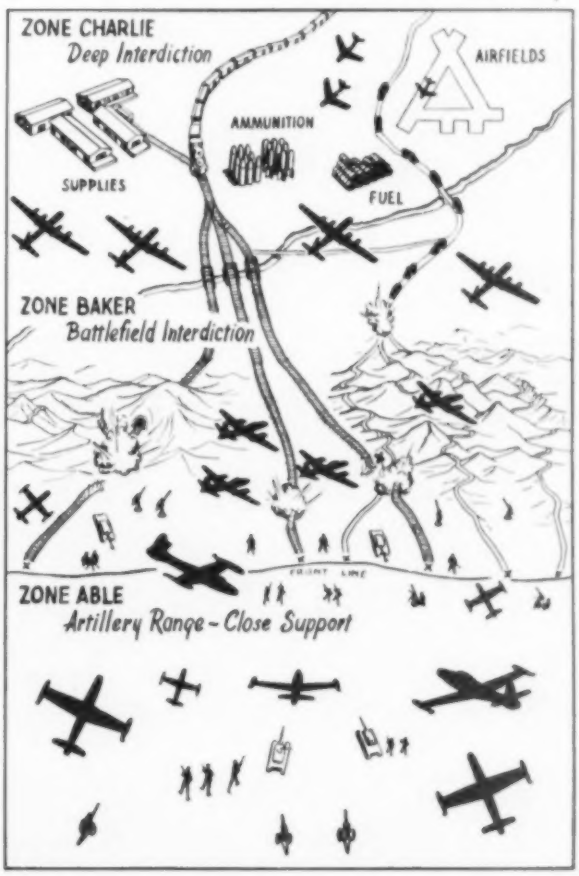
↑ CLOSE AIR SUPPORT

stopped suddenly and backed into the tunnel. But not before Dick Bull realized this was no longer a "dry" run and riddled the locomotive with his guns. He pulled up and came around for the second pass—lower this time, right down the gorge through small arms fire only a few feet above the tracks. Dick let go the Tiny Tims, then racked the F-80C up and away, barely missing the rock wall. Both rockets streaked into the hole. The train is believed to have been carrying ammunition, since the explosion collapsed the entrance completely.

This was a Tac *interdiction* mission—the kind you don't hear much about unless you study the communiques. This is duller reading than the accounts of *Sabres* versus MiGs. Yet the former are the sort of sorties that really pay off in enemy destruction. It's as true in Korean operations as it was during World War II. You have, however, heard plenty about the more immediate goings-on of *close support* of ground troops. A lot of people who should know better think of Tac Air only in this connection. A Congressman on an important committee misinformed his audience during a debate on the conduct of the Korean war when he said: "Tactical airpower is nothing more than close support for ground troops."

On the contrary, Tac's primary mission is the gaining of local *air superiority*. There are obvious reasons why enemy air gets top priority as a target: Enemy air has the ability to disrupt—or, at the very least, bring about costly delays in—the programs of the ground or naval forces. No other weapon available to these surface forces can be used against enemy air with comparable effectiveness. Our own air units cannot operate with freedom unless they enjoy at least local air superiority. To establish this superiority we strike at the Reds, in the air and on the ground, through fighter sweeps, patrols, the escort of medium, light, and fighter-bombers, and through bombing of airdromes and installations essential to air operations, such as fuel or ammo dumps. (*Continued on page* 49)

TACTICAL AIR POWER ↓



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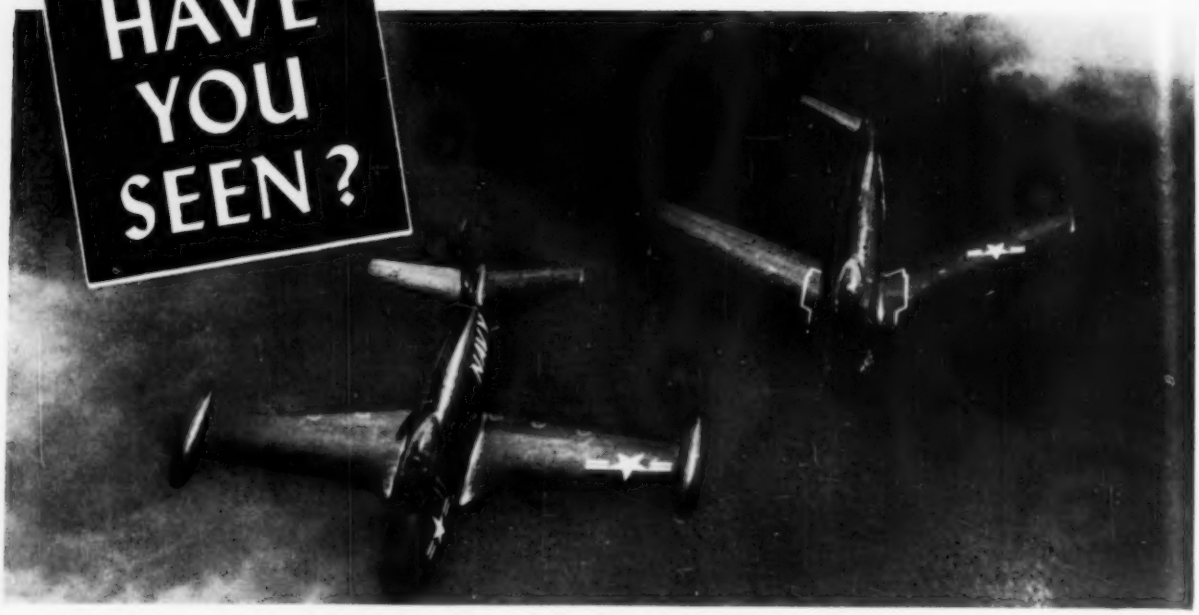
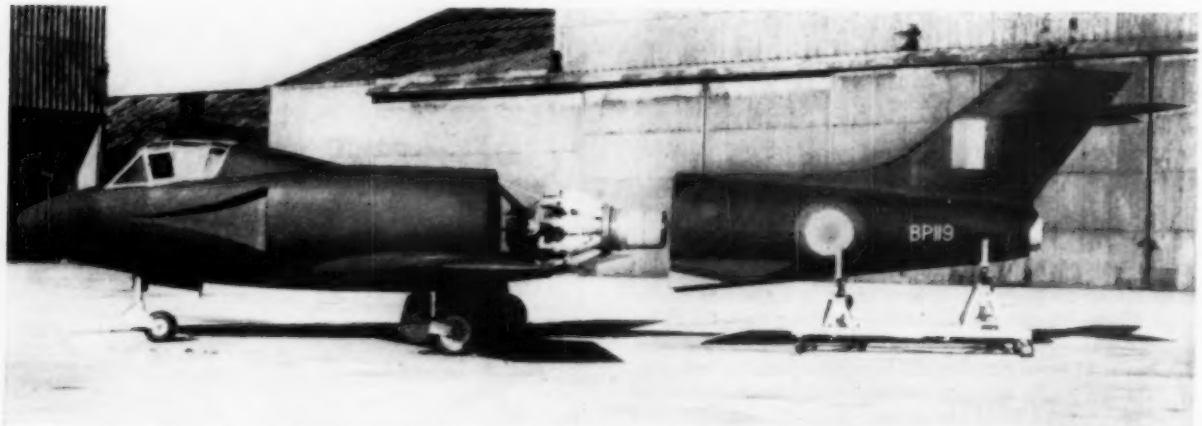
HAVE YOU SEEN?



The Navy's latest carrier-based jet fighter, North American's swept-wing FJ-2 Fury, flies formation with its predecessor, the FJ-1. The newest Fury, of which the prototype was initially flown in February, is in the 650 mph class, carries four 20 mm cannons, and has a service ceiling in excess of 45,000 ft. A General Electric J-47 turbojet is the power plant. The FJ-2 is scheduled for early production at North American's Columbus, Ohio, plant.

Sleek as a swordfish is the Navy's Chance Vought Aircraft F7U-3 Cutlass. Security rules cloak Cutlass performance but it was designed to out-fly, out-fight any other carrier-based fighter in the world. It's larger and better-equipped than the F7U-1.

The "Vihuri" is a two-place advanced trainer designed and built by the Finns. All metal except for fabric-covered control surfaces, the "Vihuri" has a retractable gear, is powered by a Finnish-built 840 hp Mercury engine and a De Havilland prop.

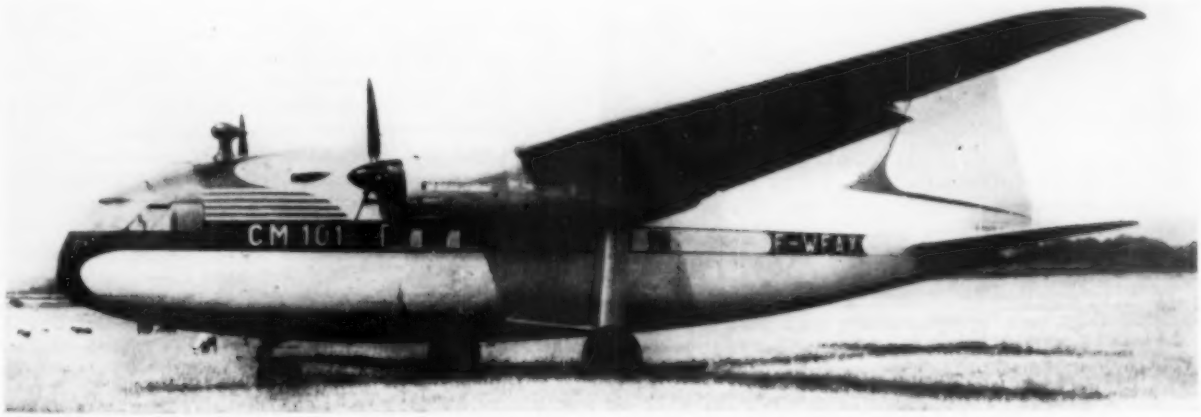


Not the real thing, but a full-size mock-up is this British Boulton Paul P. 119 advanced trainer designed for the Royal Air Force or the Royal Navy. The latter version will be fitted with folding wings. Powered by either a R/R "Derwent" or the more powerful "Nene," the P. 119 will have a span of 38 ft. 9 in., and a length of 42 ft. 5 in. Gross weight will be 9,650 lbs. With the "Nene," maximum speed will be about 555 mph at 10,000 ft., cruising 525 mph at 15,000 ft., and service ceiling at 50,000 ft. The armament will include two 20 mm. cannons, external bomb racks and rocket projectiles.

Latest "cat" out of Grumman's "bag" of flighters is the Navy's new F9F-6 Cougar, produced by Grumman at Bethpage, L. I. Rated for security reasons simply in the "over 600 mph" class, the Cougar is the swept-wing successor to the battle-tried Panther, the first jet to be used in combat by the U.S. Navy. Cougars began to roll from the production line less than five months after the first flight of the prototype, an unusual feat in the jet field.

This drawing by British Artist Roy Cross shows a new and more potent model of Russia's formidable MiG-15. Operating from German airfields, this model has increased nose armament, a larger tail and bubble hood. Note open air brakes near tail.

Photographed in the air for the first time is the Gloster GA 5, the Delta Fighter often described as "Britain's mystery plane." Powered by two Armstrong-Siddeley Sapphire jets, the GA 5 is a radar-equipped, all-weather long range Delta wing fighter.



France's Fouga CM-101-R is the world's first passenger aircraft to use auxiliary turbojet engines for take-off and climb. Two SNECMA 12-S-02-V-12 piston engines of 580 hp each and two Turbomeca Pimene jets of 485 lbs. each are arranged in tandem in a nacelle in each wing. The CM-101 cruises at 174 mph at 8,200 ft. and has a range of 9,300 miles. It carries a crew of two and 14 passengers and has a gross weight of 18,982 lbs. Span is 87 ft. 7 in. and length is 58 ft. 8½ in. Produced for civilian use, the CM-101 is a development of an assault craft originally designed for the military.

HIGH ENTERPRISE

Parking areas overflowed with the 51,922 cars that arrived at Akron-Canton Airport for the Sunday Air Fair. Other hundreds of participants flew into the airport in their own light planes. The Air Fair next year is expected to be even bigger and better.

Mapping plans for the air tour are: Fred Bailey, Airport Manager; O. R. Keyser, Stark County Agricultural Agent; Ray De Ville, co-chairman, and Dick Burwell, Ohio Aviation Board.

By CHARLES F. MOZER

RIGHT IN THE MIDDLE of the front page of the Canton, Ohio, *Repository* was the headline: "Extravaganza Was 'Perfect.'" And further down the reporter had written, "An almost unbelievable 51,922 automobiles were clocked into the airport grounds yesterday by the Summit County Sheriff's Office."

If you figure—as the highway patrol does—that those cars averaged three passengers apiece, you'll find that nearly 156,000 people swarmed over the Akron-Canton Airport on the day of the cities' Air Fair. A tidy crowd for any air show—even in a city with Akron's population.

Just why did all those people struggle through choked Sunday traffic to the airport anyway? For one thing there was a birthday party—the airport's fifth. For another, there was a Civil Air Patrol Demonstration. But most important, there was an air tour. A chance for anyone and everyone to see his city "face to face" rather than just in profile.

The air tour is no older than the Akron-Canton Airport—the first Ohio tour was held in September, 1946, when Cliff Coffman, then a Flying Farmer, took off in his Stinson one morning from Lancaster Airport with a state soil conservationist, a government farm planner, and the editor of the *Ohio Farmer* aboard. Flying a comfortable wing on Coffman were seven other planes, loaded with engineers, soil scientists, and newspaper reporters. Coffman's idea was to show them graphically and dramatically how certain soil conservation practices had worked out in Fairfield County.

The group spent most of the day cruising above Ohio's fields and forests. When they came down, they were more excited than Coffman about using the airplane to "see" the land.

From that flight on, it was a short hop to organized tours all over Ohio, then New York, and New England. In fact, Ohio has had 46 tours in the past two years alone. And in those 46 tours, more than 7,000 pay passengers—most of them first-riders—have flown about 400,000 passenger miles. So the tours, though essentially educational as Coffman planned, have actually done more—they have sold aviation to a huge new segment of the public.

"Come to the Air Fair!", read the invitation. 156,000 Ohioans came to gawk, to fly, and to learn the basics of aviation.

The 500 persons who went on half-hour flights during the Air Fair—many of them first-flighters—had a chance to look down on scenes such as this. Urban and rural areas were covered and the airborne sightseers enjoyed a new and exciting perspective.

Most of these tours have been over rural areas. Their themes have been mainly agricultural. But recently, several cities have run air tours, emphasizing planning—"Planning For Tomorrow By Studying Today." Toledo's tour in 1949 was built around "remaking our city," because, as the tour booklet said, "Our economic prosperities are dependent on Toledo's liveability, convenience, and reputation."

Akron-Canton wanted only to sell aviation, and said so outright. The theme of their tour—a tour taken by nearly 500 people—was, "Aviation is Safe and Practical."

And the two cities proved just that. In the one day they clocked 1,927 landings with not even a scratched wingtip, as ample evidence that flying can be safe. And in their Civil Air Patrol demonstration and air tours, they dramatically showed that the airplane is a practical and efficient tool.

It takes more than a heartfelt desire to sell aviation to pull 156,000 people to an airport—even on a sunny Sunday. And that's where the most important elements, planning and hard work, came in.

To begin with, the combined Junior Chambers of Commerce of Akron and Canton agreed to sponsor the Air Fair, with the CAP demonstration and air tour as major attractions. The Jaycees picked Ray De Ville of Canton and Faye Jenkins of Akron as co-chairmen.

For these two men, the first and most important job was to sell the Air Fair to the people of both cities. So *publicity* became the key word in De Ville's vocabulary from the day he accepted the job as co-chairman until the day of the Fair.

Publicity became the key word because an air tour over a city doesn't have the powerful attraction that a rural tour does. It's not as personal. A farmer wants to see his own farm. He wants to see how sod waterways or strip farming or reforestation have improved his land—the soil from which he makes his living. To him it's an urgent matter.

To city folk the things best seen from the air—clogged highways, an inadequately developed waterfront, and excessive industrial smoke—are more irritations than they are matters of immediate concern. So the sponsor of any urban air tour must pull his crowd to the airport by other means.

Therefore, at the first meeting in Airport Manager Fred Bailey's office, the talk centered on publicity. "What can we show them? And how can we get them to come and see it?" asked De Ville.

Dick Burwell of the Ohio Aviation Board, an old hand at running air tours, knew the answer. "Show them plenty of good industrial displays and give them a show by the CAP and the military that they won't forget."

With only 30 days in which to line up such displays, De Ville and Jenkins had their work cut out for them. By the next morning they had sent air mail special delivery letters to every well-known aircraft manufacturer from Beech to Boeing and from Rawdon to Republic, asking for cutaways, mock-ups, and models.

Other letters and telegrams went to Wright-Patterson Field, the Dept. of Defense, and FLYING Magazine, asking for helps and hints.

For the air show that Burwell mentioned, the committee planned an aerial spraying and dusting exhibition, fire fighting, and an air-sea rescue (*Continued on page* 50)

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JUDGMENT

WHEN CLARENCE WAS A STUDENT HE HEARD PLENTY ABOUT "HOT" PILOTS!
ABC
HE KNEW IT DIDN'T MEAN THIS:
STEAM ROOM
AJAX A.C.
HE THOUGHT IT MIGHT MEAN THIS:
THEN ONE DAY...
HE MET A PILOT WHO EVERYBODY SAID WAS THE HOTTEST THING IN THE AIR. CLARENCE WAS NO DUMMY SO HE ASKED THE PILOT WHAT MADE HIM SO HOT?
HOWDY!
AND THIS IS WHAT THE HOT PILOT SAID:
A "HOT" PILOT IS A COOL PILOT. HE IS COOL BECAUSE HE IS A MASTER AT HIS JOB. HE KNOWS THERE IS TOO MUCH TO KNOW ABOUT FLYING FOR HIM EVER TO LEARN IT ALL. HE NEVER STOPS TRYING TO LEARN. THE MORE HE LEARNS THE BETTER HIS JUDGMENT BECOMES. THE BETTER HIS JUDGMENT BECOMES, THE LESS TROUBLE HE GETS INTO. WHEN HE DOESN'T GET HIMSELF INTO TROUBLE HE HAS NO TROUBLE KEEPING COOL. AND THAT'S WHAT MAKES HIM "HOT." YOU SEE THAT DON'T YOU?
YES, SIR! I SEE THAT. YOU MEAN YOU PUSH THE PEDALS WITH YOUR FEET AND THE CONTROL COLUMN WITH YOUR HANDS BUT YOU FLY WITH YOUR HEAD.
CLARENCE, YOU ARE A BRIGHT BOY! YOU HAVE A FLARE FOR UNDERSTANDING. NOW ALL YOU NEED IS THIRTY YEARS FLYING EXPERIENCE. THEN YOU ALSO WILL BE A "HOT" PILOT!
FROSTY

Rotary Wing Review

Igor Sikorsky at the controls of the VS-300, first flown Sept. 14, 1939

Gyrodyne GCA-2—Co-Axial Type

Hiller Hornet—Jet Propulsion Type

Kaman HTK-1—Intermeshing Type

By WARREN D. SHIPP
and
HOWARD LEVY

OF ALL FORMS of man-made flight, none has enjoyed more universal acceptance than the helicopter. In just a few short years it has grown from awkward experimental craft to smooth machines of universal utility. Its applications are endless.

The helicopter emerged from its embryo on a September afternoon in 1939 when a balding man with a small moustache sat at the controls of the world's first successful helicopter. As he hovered his strange machine a few feet above the ground, Igor I. Sikorsky opened a vast new frontier of the air age. Although the Sikorsky machine was not the first helicopter to leave the ground, it nevertheless was the most successful, fulfilling the four basic requirements of the true helicopter. It could take-off, rise, and descend vertically; hover indefinitely; fly in any direction; and all under complete control.

In considering the rapid development of the helicopter, we should not overlook its important ancestor, the autogiro. This connecting link between the airplane and helicopter began with large airplane-type wings which, as developments in rotor design progressed, got smaller and smaller until they were dropped altogether. We then had the so-called "wingless" autogiro.

Because of a seemingly similar appearance, the autogiro is often confused with the helicopter. Basically, the major difference lies in the motivating force that turns the rotors. In the helicopter, the rotors are turned by an engine which is directly connected to the rotor hub. The autogiro, on the other hand, has an engine that turns a conventional propeller. The rotors are free, and turn because of the action of the relative air flowing past them.

The autogiro is not capable of absolutely vertical flight,

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MFR. and DESIGNATION	SEATS INCL. CREW	TOTAL H.P.	USEFUL LOAD LBS.	ROTORS	BLADES	TOP SPEED M.P.H.	NORMAL RANGE MILES	REMARKS
ANTI-TORQUE TAIL ROTOR TYPE								
BELL 47D-1	3	178	820	1	2	92	214	In Production for civilian use. Bell stabilization by centrifugal weights. Plexiglas full-view cabin.
H-13D	3	200	822	1	2	98	161	Similar to 47D-1. Used by Army field forces for evacuation, spotting, etc. Has uncovered fuselage. Uses Bell rotor system.
HTL-3	2-3	200	725	1	2	98	210	Navy & Marine version of H-13D. Fuselage is covered.
HTL-4	2-3	200	579	1	2	93	151	Latest military model.
48A **YH-12B**	8-10	600	1839	1	2	120	300	Built for Army field forces. Used for cargo-carrying, medical evacuation, troop transport. Uses typical Bell rotor stabilization system.
DOMAN LZ-4A	7-9	400	1800	1	4	100	210	Uses Doman dynamically balanced rotor system of rigidly mounted rotor blades. Cab-over engine arrangement. Only US. helicopter using 4 blades.
HILLER 360 **H-23A** **HTE-1**	3	178	794	1	2	84	210	Uses inherent stability paddle rotor control. Civilian version was first trans-U.S. helicopter. H-23B has larger engine, simplified cockpit, skid landing gear.
SIKORSKY S-51 **H-5** **H03S-1**	4	450	1695	1	3	103	276	First civil helicopter to get CAA license. Built in England by Westland under license. Military versions used for air-sea rescue work are sometimes equipped with Tundra inflatable landing gear for water landings.
S-52 **YH-18A** **H05S-1**	4	245	1000	1	3	111	306	Civil, Navy and Army field forces versions. General utility helicopter for rescue, cargo, medical evacuation. Half of nose canopy swings out to permit litter loading.
S-55 **H-19** **HRS-1** **H04S-I**	12	600	2405	1	3	110	462	Civil, Army, Marine & Navy versions. Cab-over engine design. Used for troop transport & cargo carrier. Is the largest helicopter in operation in Korea, used by Marines to deliver fully equipped combat troops to front lines. First time a 'copter was so used
SIEDEL S-4	2	115	520	1	2	70	200	General purpose helicopter. Double deck arrangement —passenger sits behind & slightly below the pilot.
S-4A **YH-24**	2	130	550	1	2	65	170	Military version in production. Improved S-4.
Military Designations in **Bold Face** Type.								
TANDEM ROTOR TYPE								
McCULLOCH MC-4	2	165	600	2	3	100	260	Small crafts for commercial & private owner. Developed from the Jovanovitch JOV-3. Company has orders from Navy to develop craft as a light trainer.
PIASECKI **HRP-1**	10	600	1900	2	3	87	265	Piasecki built the first tandem rotor transport helicopter. HRP-1 is the Navy version, has a fabric covered fuselage.
HRP-2	10	600	1924	2	3	105	300	Improved version of HRP-1, this craft has a metal covered fuselage, other improvements. Rotors fold for storage aboard naval vessels.
HUP-1	7	525	1526	2	3	125	400	Production model of XHJP-1 which was first helicopter to make long distance flights "hands off" on auto-pilot specially made for helicopters.
H-21	16-22	1425		2	3	130	610	Army version of HRP-2, craft is larger and more streamline. For general utility work.
XH-16	25	2850		2	3			Large transport type has fuselage size of C-54 and features detachable pod size of Greyhound bus. Second proto will have 2 Allison T-38 turbines.
AMERICAN HELICOPTER XA-5 "Top-Sergeant"	2	95	580	1	2	80		**JET PROPULSION TYPE** First of a series of military designs. Craft can be assembled in 30 minutes. Rotor system tested on reworked R-6 fuselage.
XA-6 "Buck-Private"	1			1	2			Most of the info on this little helicopter is restricted.
McDONNELL **XH-20** "Little Henry"	1-2		500	1	2	50		World's first ramjet helicopter. Demonstrated the idea of a light, three-dimensional motion motorcycle.
HILLER HORNET	2	70	544	1	2	85	50	Small personal vehicle. Rotor has solid leading edge of aluminum extrusion and magnesium trailing edge. Uses same Hiller control system as on larger 360.
MARQUARDT M-14 "Whirlajet"	2			1	2	85		Used as test rig for tesing jet-propelled rotor system. Was first pulse-jet helicopter flown.
HUGHES XH-17	2			1	2			Huge flying crane designed to lift large, bulky cargo. Has four after-burners in each rotor-tip.
H.P. of Jet Engines is listed in lbs. static thrust.				Tandem rotor 'copters have counter-rotating rotors.				
LATERALLY DISPLACED TYPE								
McDONNELL **XHJH-1**	10	900	4000	2	3	100	350	First twin-engine helicopter. Designed so that either engine would drive both rotors. Now in Smithsonian Institute.

MFR. and DESIGNATION	SEATS INCL. CREW	TOTAL H.P.	USEFUL LOAD LBS.	ROTORS	BLADES	TOP SPEED M.P.H.	NORMAL RANGE MILES	REMARKS
INTERMESHING TYPE								
KAMAN K-225	3	225	1200	2	2	73	200	Uses Kaman servo-tab control, the flexible blades are twisted by air action on small airfoils near blade tips. For industrial duties.
K-225	3	175	....	2	2	...	...	First helicopter to fly in U.S. with gas turbine engine. Uses shaft power of engine. Now under Navy tests.
HTK-1	3-4	235	....	2	2	...	...	Trainer for Navy, has folding canopy so craft may be used for medical evacuation. Has improved servo-tabs, longer rotor blades, twin fins.
KELLETT XH-10	12	1050	2800	2	3	120	362	First twin-engine intermeshing helicopter. Company did engineering for huge Hughes XH-17. Formerly built popular Kellett autogiros.
CO-AXIAL TYPE								
BRANTLY B-1	2	150	700	2	3	...	...	Civilian helicopter using all-metal blades. Rotors have flapping hinges 6' out from hub so that the two sets of rotors need not be greatly separated.
PENTECOST Hoppi-copters 103C	1	40	170	2	2	90	90	Will be built in England under license. Original is in Smithsonian Institute.
GYRODYNE GCA-2	4-5	450	1800	2	2	112	270	Served as flying test bed for convertaplane experiments equipped with two 100 HP. auxiliary engines mounted outboard driving tractor propellers.
GCA-2C	6	450	1800	2	2	100	...	Rebuilt GCA-2 with controllable airplane-type tail surfaces. Undergoing Navy flight evaluation.
RANGE is normal range under normal operating conditions. All twin rotor types have counter-rotating rotors.								**USEFUL LOAD** includes gas, oil, crew, passengers and baggage.
ENGLAND								
WESTLAND-SIKORSKY S-51	4	540	1250	1	3	103	303	This is the American Sikorsky S-51 built under license using British engine.
Dragonfly Mk. I	4	540	....	1	3	...	...	Military version of S-51. General utility.
S-55	12-14	600	2405	1	3	110	462	Built in England under license. Is similar to U.S. HRS-1 including engine.
BRISTOL 171 Mk. 3	4-5	550	1000	1	3	133	310	General purpose craft. First helicopter by Bristol and first British design 'copter to fly Channel. Military version called Sycamore Mk. 10 & 11.
173	15	1100	2500*	2	3	142	300	First British Twin-Engine, twin-rotor design. Resembles Piasecki type.
SAUNDERS-ROE Airhorse W.11	26	1620	3755*	3	3	150	330	Has unique triangular displacement of rotors. First prototype crashed; second will have two engines.
Skeeter Mk. 1	2	106	430	1	3	85	85	Light, personal type helicopter.
Skeeter Mk. 3	2	145	....	1	3	95	295	Improved version of Mk. 1
Skeeter Mk. 4		183	....	1	3	...	...	Naval version. Data incomplete, ship still under test.
FAIREY Gyrodyne FB-1	4-5	520	1350	1	3	124	250	Combines principles of autogiro with helicopter. Has forward pulling propeller on right side for added speed and torque offset.
ITALY								
BORDONI GIANNINI MANZOLINI Libellula	2	75	550	2	2	115	375	Planning four-passenger helicopter. Only Italian helicopter flying at present.
* Indicates payload, does not include fuel & oil.								
FRANCE								
BREGUET Gyroplane G-11E	5	450	1389	2	3	133	292	Craft originally powered by a Potez 240 HP. engine. Only French co-axial design.
SNCA-CENTRE Abeille NC 2001	5	495	....	2	2	155	...	Only French intermeshing design. SNCA-Centre has been disbanded. research taken over by Sud-Ouest.
SNCA-NORD Norelic 1700	2	156	968	1	2	115	250	Tail rotor at end of fuselage pushed craft in direction of light. After tests project was abandoned.
								Engine turns blower and the compressed air is forced
SNCA-SUD-OEST Ariel II 1110	2	187	792	1	3	102	105	through blades where it is mixed with gas and ignited near tips, producing jet effect.
Ariel III 1120	2-3	245	1254*	1	3	112	155	Same as Ariel II except for engine.
SNCA-SUD-EST 3000	6	1000	1943	2	3	106	193	Developed from German Foche-Achgelis FA-223 "Drache".
3101	1	100	268	1	3	75	62	Flying test bed for 3110. Has steel spar rotors with fabric covering.
3110	2	203	610	1	3	110	186	Rotors are molded plastic with steel tube spars. Twin tail torque rotors in butterfly position.
3120	3	203	1076	1	3	81	102	General purpose helicopter.
CANADA								
SZNYCER-GOTTLIEB S.G. VI-D	3	178	675	1	4	90	120	General purpose 'copter. Two versions flight tested.
H.B. PICKEN Helicon		145	....	1	3	...	...	Flying test bed for Picken tilting rotor head.
BRAZIL								
BAUMGARTL PB. 61	1	65	200	2	2	...	...	First South American helicopter.
* Indicates payload, does not include fuel & oil.								

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nor can it hover motionless like the helicopter. It must move forward for the rotors to turn and create lift. However, research and testing of the autogiro proved a great asset to engineers in helicopter experimentation. Without the autogiro, the development of the helicopter might have taken many more years.

Although helicopters have been widely publicized, considerable mystery still surrounds them. What makes them fly? How do they obtain lift, stability, control and forward motion? In trying to answer these questions simply, we will use the Sikorsky VS-300 model since it exhibits clearly the methods of surmounting the problems peculiar to helicopter design.

When an airfoil (wing) is pulled or pushed through the air fast enough, it creates lift. A helicopter has wings too, but, unlike the airplane, it rotates its wings (rotor blades) about a central vertical axis at a speed sufficient to lift the craft from the ground. Almost all helicopter rotor blades are hinged at the hub so that the angle of attack of each blade may be increased or decreased to control the amount of lift required. This is called "collective pitch control." The blades also can be controlled so that they increase their angle in a particular sector of their rotation. This gives the craft forward, sideward, or backward motion depending on the sector in which the angle is increased. This control is called "cyclic pitch control."

With few exceptions, the blades of helicopters are hinged to allow them to "flap" up or down within limits designed to prevent the tips from striking the ground, fuselage, or tail. In flight, due to the lift of the blades, the tips tend to rise higher than the hub, forming dihedral. This angle is called the "coning angle." Centrifugal force restrains the blades from assuming too great an angle. In all helicopters, the center of lift is well above the center of gravity and, coupled with the coning angle, contributes to inherent stability.

The cockpit of a helicopter is quite similar to that of an airplane. The "stick" and rudder pedals are there, but the conventional throttle is missing. On the instrument panel is a Rotor RPM indicator, and on the left side of the seat is another "stick." What appears to be the conventional airplane-type control stick at the center of the seat is the "cyclic pitch control" stick and is quite simple in operation. You merely push it in the direction you wish to fly—forward for forward flight, back for backward flight, and to either side for sideward motion. The stick at the left side of the seat is the "collective pitch control" stick and is also simple to operate—pull it up to rise, or push it down to descend.

Throttle control of the engine is located in the handgrip of the collective pitch control stick and it works like the throttle of a motorcycle, that is, by turning. If you want to rise, pull up on the collective pitch control stick, and, as more power will be required, twist the throttle control. Conventional appearing "rudder" pedals provide directional control.

While many reasons exist for the particular shape ("configuration" is the word preferred by the industry) of a helicopter, the most obvious is the designer's method for counteracting or eliminating torque—the reaction of the plane to the turning of the propeller. Therefore, each helicopter will fall into one of six general classifications, namely: *tail rotor type; tandem; laterally displaced; coaxial; intermeshing; and jet-propelled.*

Of the six types, two are single main rotor types. They are the tail rotor type and the jet-propelled type. The others all have two main rotors, except the Saunders-Roe *Airhorse* which has three arranged in the form of a triangle.

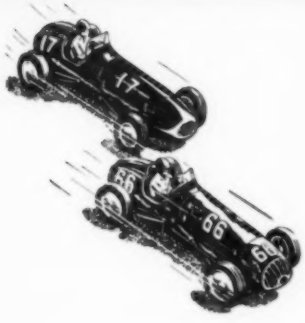
The tremendous torque of the rapidly rotating rotors of the Sikorsky VS-300 was offset (*Continued on page* 52)

Piasecki HUP-1—Tandem Rotor Type

Sikorsky H-5—Anti-Torque Tail Rotor Type

McDonnell XHJH-1—Laterally Displaced Type

Shank Airport looks like this when the private pilots come to Indianapolis for the 500-mile Memorial Day race classic. This shot was made at the time of the 1951 race.



OFF TO THE RACES

The sky's the highway for auto racing fans off to Indianapolis.

By DAVID WATSON

FASTER, CHEAPER, and, by traffic accident reports, safer—the sky is the highroad to Indianapolis, come Decoration Day and the Speedway automobile race classic.

Since 1946 more than a thousand private pilots each May 30 have flown into one of Marion County's four airfields . . . Sky Harbor, Brightwood, Bob Shank Field, and Weir Cook terminal. Shank Field is but one and one-half miles from the Speedway gate and Cook Municipal but five miles.

Buses and cabs are available at all fields for transportation to the track. None of the four airports charges landing fees for itinerant private planes flown to the races. Gas, service, and repairs are available at all fields.

Historically the weather man has smiled on Indianapolis skies except for the year 1950 when thundershowers were prevalent. If overnight stops are desired either before or after race day the several airport managers are prepared to help visiting airmen secure lodgings. Each of the four airports, except Brightwood, has dining facilities.

No extra-ordinary air regulations restrict private planes flying to the races. Each year prior to May 30 the CAA distributes its special notices covering the event. Most important of these notices is the (*Continued on page* 52)

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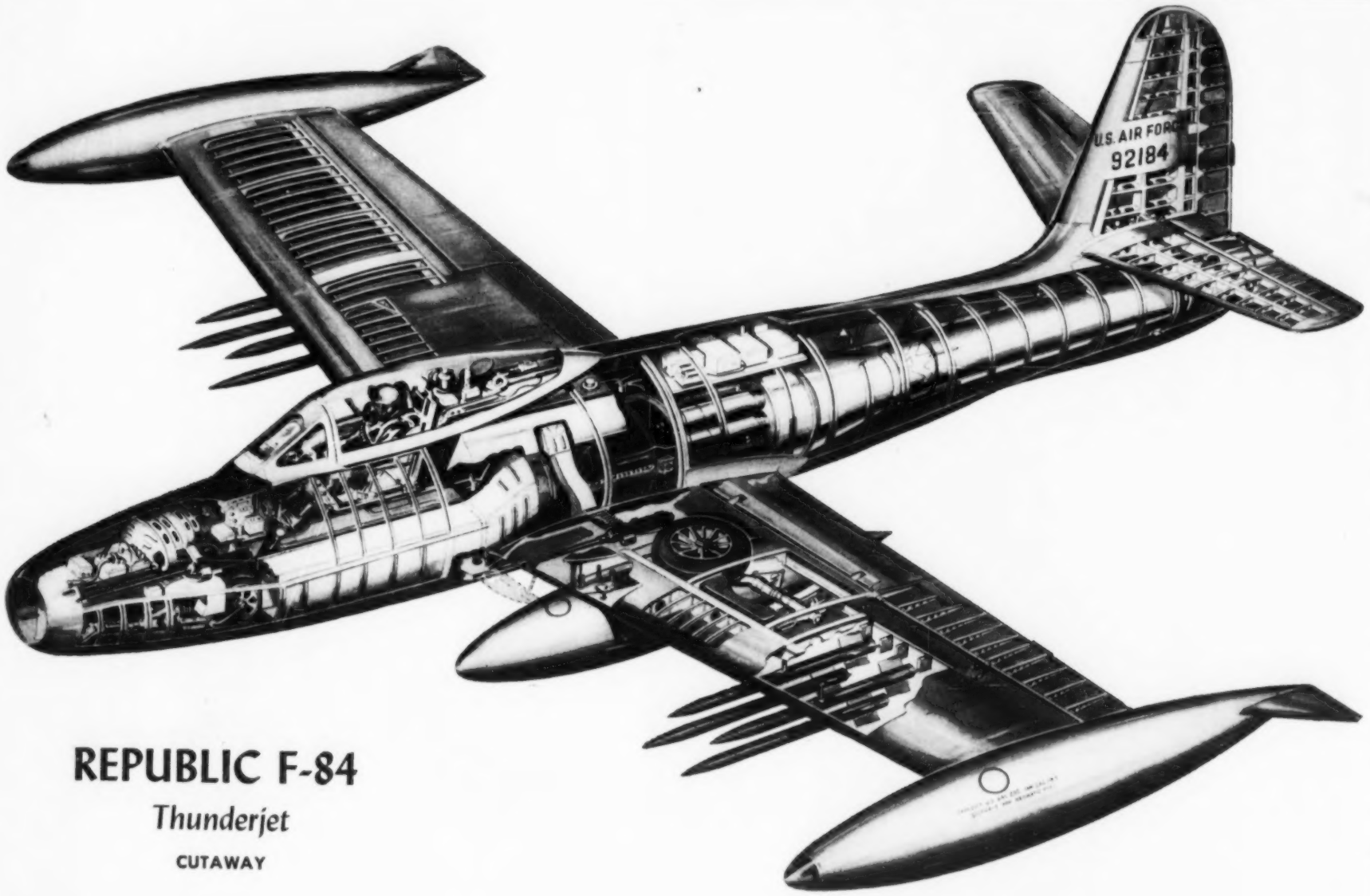
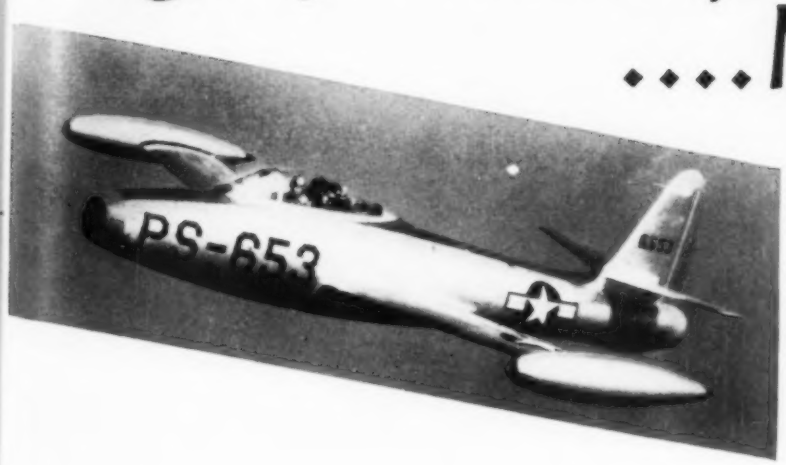


REPUBLIC F-84

Thunderjet

CUTAWAY

What makes the mighty *Thunderjet* ....MIGHTY



Speed is not the only asset of "jets". The F-84 packs a wallop exceeding that of "heavy" bombers which leveled Festung Europa.

NOT TOO MANY of us ever get a chance to examine at first hand the innards of a "jet" fighter. This cut-away of the Republic *Thunderjet* F-84, which has been bearing the burden of the "interdiction" in Korea, is presented for those who otherwise might be left to wonder what makes the famous fighter-bomber tick.

Features of her construction can be noted and appreciated even by those who have no technical knowledge of airplanes.

The plane is all metal. The framework of the fuselage is of a type called semi-monocoque and we see that the shape progresses from circular to oval. Just forward of the wing's trailing edge the fuselage can be quickly separated to permit access to the gas turbine engine.

The internal fuel supply is contained in two fuselage tanks and five fuel cells in each wing panel. Tip tanks contain extra fuel and may be jettisoned. One fuselage tank containig 143 gallons is directly under the pilot seat and the other of 147 gallons capacity may be seen just aft of the cockpit in the upper half of the fuselage.

If the fuselage is pulled apart the after section will be found to contain the combustion, turbine, and exhaust assemblies of the J-35-A-17 turbine engine. To protect this structure from excessive heat the tail pipe, which is easily identified, is enclosed in a metal shroud. Rudder and elevator controls, JATO bottle mountings and fuel tank vent lines are installed between the shroud and the outer fuselage skin.

Above the engine in the fuselage, in a fume-proof housing, we can see installations of radio, directional gyro control and remote compass amplifier.

Turning to the forward section of the fuselage we identify the air intake in the nose and the 15-foot duct to the engine, as well as the cockpit, the gun bays, radar sighting gear, the ejection seat of the pilot, and various apparatus at his command.

The cut-away of the wing shows the multi-cellular structure which gives great strength. Each wing panel is fastened by four bolts to fuselage hinge fittings. Note how the main wheels lie within the wing when retracted in flight and the position of the nose wheel when likewise retracted into the fuselage.

Each tip tank contains 230 gallons. Fuel and air lines from these tanks are routed along the leading edge of the wing directly into the fuselage.

The Allison axial flow turbojet engine which powers the *Thunderjet* has an overall length of more than 12 feet and a diameter of 3 ft. 4 inches. Weighing dry the Allison tips the scales at 2,260 pounds and has a thrust of 4,900 static pounds for take off at sea level.

Details of the engine are difficult to identify even in a cut-away drawing but several of the eight combustion chambers may be noticed. The multi-stage compressor assembly includes eleven rotors and the turbine wheel has 95 buckets.

All internal fuel tanks are self-sealing. Normally fuel is supplied the engine from the main tank, the others being used to replenish the main, but under emergency other tanks than the main may feed directly to the engine.

Many combinations of armament are adaptable to the F-84. Ordinarily six M-3 .50 guns are used, four in the fuselage and two in the wings. Ammunition boxes for each gun contain 300 rounds. Also normally the Thunderjet carries two 500-lb. bombs on under-wing pylons, 8 HVAR rockets on outboard wing posts and, when desired, the tip tanks are filled (*Continued on page 57*)

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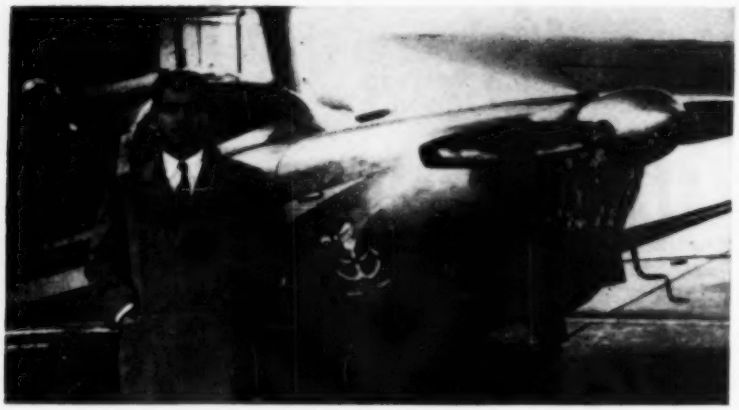


S. L. Katten finds his Swift a business asset.

He set his Swift-125 down at Southington Airport OK—THEN the author learned the field was out of business.

I Learned About Flying From That! NO. 148

By S. L. KATTEN

THE CRISP, wintry morning was bright and clear as we winged our way, enroute to Plainville, Connecticut. I was flying a Swift-125 on one of my frequent business trips, originating from Philadelphia. One of the company's salesmen accompanied me.

Weather charts and sequence reports had been carefully consulted at Philadelphia International the evening before to be certain that the cold front would have moved to sea, leaving New England with VFR flying conditions.

Our speed boosted by favorable winds, Trenton, Princeton, Newark, Westchester County and Bridgeport fell astern beneath our wings. Over Meriden, I altered course to the northwest and began my letdown. Because there were no prominent landmarks near the field we intended to use, and because I was unfamiliar with its exact location, I planned to fly a straight leg between Southington and Plainville, which should take us right over the field. We spotted an airport south of Plainville, but closer investigation revealed it to be Bristol. I doubled back at 1500 until I came upon the field for which we were looking, Southington. A check of the field from 500 feet revealed two or three large iced-over areas adjacent to the main runway, and several planes tied down on the line, including a brightly painted twin Cessna. The runway appeared smooth and level with no telltale tire ruts to indicate soft or rough ground.

I had telephoned the gentleman we were to visit, inquiring about a suitable landing field. He had recommended Southington in preference to Bristol because it was larger and also closer to the factory. To his recollection, most everyone who flew to the plant had used Southington. A check of Flight Information Manual and Airman's Guide substantiated this information. Southington had longer runways than Bristol, and 80 and 90 octane gas available.

The field looked satisfactory even though there were no signs of activity, which I attributed to the early hour, and we squared away for the landing. When I applied brakes a few seconds after touchdown, I knew immediately something was wrong. Nothing happened. Looking closely at the ground, I realized my mistake. The surface of the runway had the consistency of watery cement. I held the brakes, wheels locked, for whatever it was worth. Fortunately the runway was uphill considerably in that direction, bringing us to a stop with not more than 20 yards to spare.

Taxiing back to the line on the dead grass beside the runway, I studied the mired area, wondering why I was unable to detect it from the air. The warm sun had thawed the upper crust of the soil to a depth of approximately two inches, under which the ground was still hard, fortunately for us. After tying down the ship, we walked to the nearest house to telephone for transportation. Here we learned that the field was closed, inoperative. The organization running it had gone bankrupt a month before.

Our business completed, we drove back to the field in the chill, late afternoon. The second mistake of the day followed. I made two runs down the grass alongside the runway in attempt to take off, but on both occasions failed to gain flying speed. I did succeed in thoroughly covering the ship with mud from the still soft spots which I had not noticed until too late.

It required the assistance of the local water company and five hundred feet of garden hose, run from the nearest hydrant, to wash the mud from the wings and fuselage. Late afternoon of a New England winter was no time to splash freezing water all over everything, but the mud had to be gotten off before it hardened. Upon finishing the unpleasant task, we rolled the ice-covered Swift back to the line and tied her down. We left with a promise from the family owning the field that they would watch the ship.

The fine weather wasted, we drove to New Haven to catch a train for Philadelphia. (*Continued on page* 46)

GOOD TO HEAR

It is refreshing and inspiring to see a magazine such as yours swinging back to civil aviation and recognizing some of the problems of the general aviation segment of the civil aviation.

Such articles and ideas as "The Farmer Takes a Tour" (FLYING, March) holds tremendous possibilities for general aviation. The "You Can Survive" article is bringing attention to facts that should have been publicized long ago and not only publicized but continually emphasized.

I would like to say 'Amen' to the March editorial and to compliment you for giving the heretofore little publicized problem of aviation education the publicity that you have in this issue. It is indeed hopeful to see a magazine showing interest in the field of general aviation, which is at this time so critically in need of assistance.

HAROLD D. WEATHERLY
Aviation Development Coordinator
Oklahoma Aviation Commission
Oklahoma City, Okla.

PAGING A PEN PAL

I am particularly interested in the guided missiles section of aviation and have been trying for some time to contact someone with an interest in the subject. I wonder if any of your readers would be interested to contact me? Or if there is anyone who would like cuttings from English aviation magazines on their own pet subjects, I would be very pleased to supply them in return for cuttings on guided missiles from U. S. magazines.

C. D. SCOTT
L/OBS, Royal Observer Corps
40, Langhill Road
Mutley,
Plymouth, Devon, England

MORE ON LIGHTPLANES

I want to add my voice to those who deprecate the increasing amount of space devoted to military aviation in your magazine. I have only a very indirect interest in military flying since I never expect to have anything to do with it and regret that any of it should be necessary.

How about more news about lightplane developments, maintenance tips, meteorology and aerodynamics?

For your information, I have logged about 1,200 hours as a private pilot and have owned planes for five years.

REGINALD WOOD
New Milford, Pa.

FALSE ALARM

I have read with interest your article called "Alarm Clock Navigation" (FLYING, March). In fact I went out and bought the alarm clock exactly like the one shown in the picture. I would like to give you the following information as constructive help for correction and a suggestion to make this a better instrument.

First, I cut out the diagram and found it does not fit the face of the alarm clock like the picture shows. (See corrected diagram—Editor.)

My suggestion for making this a better instrument for future use after August of this summer, would be to set it up in nautical miles instead of statute miles since this is going to be a new regulation for all of us fliers thereafter. Also, if it were possible, make this new face so it could be used for flying such planes as Navions, Bonanzas, Cessna 195's and 170's. Even a Cessna 170 can make a speed as high as 150 miles per hour with tail winds and, of course, these other faster planes I mentioned can do up to 200 miles per hour. If this is all made in nautical miles it would have to be transposed to nautical speeds.

I am only a private pilot and I started flying in June, 1946. I have accumulated approximately 1,000 hours up to this date. I am a business man 45 years old last January. It was indeed a disappointment and a let-down after reading this article to find that the diagram did not work and the thought of having it in nautical miles came to me as I worked on this project. I had planned to have a lot of fun with this computer.

JOHN SLOAN SMITH
Indianapolis, Ind.

G.O.C. IN ILLINOIS

In Civil Air Patrol Wing Talk in the March issue it is mentioned that the CAP furnished planes for an exercise to test the Ground Observer Corps on the East Coast.

I would like to mention that such an exercise was conducted in the mid-West in January. Within 30 miles of Erie two CAP units furnished planes, the Moline, Ill., squadron and the Sterling, Ill., flight.

I was on duty six hours during the day of the exercise and reported 24 planes, which made it a slow morning.

Although I am only 14 I am an observer in the G.O.C. and am always called upon because the Chief Observer thinks I am about the best observer he has. I am going to join the CAP this summer when I am 15. I always read your excellent magazine for the latest dope on flying and CAP.

Erie is on Airway Green Three about 25 miles ENE of Moline and we usually have a heavy traffic of airliners.

GEORGE H. WHEELOCK
Erie, Ill.

MILITARY PREFERS CIVIL

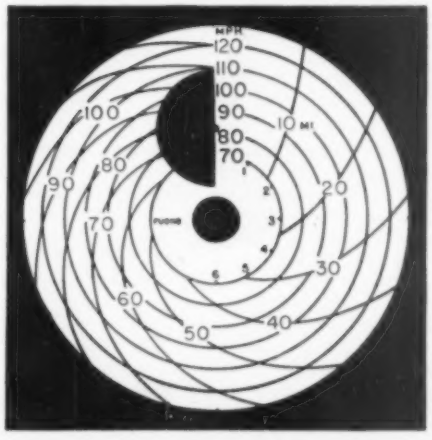
This is a cumulative letter of appreciation for many articles written for the private pilot. I refer to those such as "How to Run a 100-Hour Check," "How to Start that Engine" and "Alarm Clock Navigation." Articles like these fill a very important gap in most cases and are invaluable to the private pilot who operates on "marginal funds." I am not yet in a position to make full use of these articles as I am not a plane owner, but I am salting all away against the day I manage to collect enough to buy, something of a trick on a corporal's pay.

As for the current Military vs. Civil debate that I have noticed in the recent letters in your magazine, I am inclined to favor the Civil as I have access to considerable technical data through military channels. However, I do read with interest the pieces on new research and development such as Delta Wing and Channel Wing aircraft.

Thanks for the plug I remember seeing some time ago in defense of Tower Operators. That is my present job in the Air Force.

CORPORAL WILLIAM J. STARR
Bryan AFB, Texas.

● *To Reader Smith and others who were inconvenienced by the error in the proportions of the alarm clock diagram, our apologies. We're printing the diagram here in its proper scale and trust that* FLYING'S *alarm clock navigators aren't too discouraged to take it from here.*—ED.



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FURTHER EVIDENCE

I read your fine editorial in the March issue of FLYING and it hit the nail right on the head, pardon the expression. What you said is true. For instance, I live near Elizabethtown, Ky., and we do not have a flying school or field here. It is a town of 5,500 pop. I, myself, have a small Cub which I fly as much as possible. There are several here who are interested in aviation but that is as far as it goes. I was issued a student permit last year and have completed all my paper work but lack my final CAA flying test.

I wish more people would wake up and see the danger point that is increasing and do some good writing like you have. It seems the nation is trying to encourage our youth into "Hot Rods".

HAROLD BEWLEY

Elizabethtown, Ky.

TOO MANY REFINEMENTS

Answering your editorial, "What Has Happened to America's Youth?" (FLYING, March), I would like to offer a few remedies.

Over this country of ours are hundreds of American boys and girls looking for adventure and a challenge in life. I have wondered many times why there haven't been more articles in your magazine to fit the imagination of youth and the economically poor flyer. By this poor flyer I do not mean someone like Arthur Godfrey or Gene Autry who does a $500,000 business a year and finds his Cessna or Piper Pacer so economical. I am concerned about the really little man or boy who works for a salary and finds it hard to spare three dollars a week for one half-hour flying time in a Cub.

Most of your reading material is about some far fetched jet machine or "in the future" helicopter that only the Air Force can afford to fly. This is all very interesting. I like to read it, but for Pete's sake why don't you feed the hungry spirits of the common boys. As dashing as an F86 may be with its supersonic speed, it has lost the romance of truly flying. Men have known cannon balls for ages, but few have ever had the desire to ride one.

No longer can a pilot listen to the beautiful music that flows from his exhaust stacks, and neither can he see his engine in operation. It's covered with a sleek, shiny cowl. Even our dear little Cub has an engine cowl these days. Why should an American boy want to fly when what he flies so much resembles his Dad's family car that he hardly realizes he is flying a flying machine?

Why do boys and girls like flying anyway? It's the romance and challenge they get from copying the birds, the beauty of the sky and earth above and beneath them, the whistle of the wind through the struts and flying wires, the exhaust from the stacks, the off and contact of cranking procedure. These are the things that youth like about flying. Our manufacturers will do well to make a note of this in constructing a personal plane. Why doesn't somebody build a copy of the old Gipsy Moth with a few improvements? There's some honest-to-goodness flying!

I believe that if you would p.int some simple stories of "rent a plane fliers," add the glamor of a parachute on each instructed flight, and take a business man's hat off the pilot, you will have something dear to the heart of the American boy.

HERBERT A. CAHILL

Danville, Va.

JUNIOR GRADE

Enclosed is a picture of my four-year-old son, Michael, looking at the pictures in the Navy issue of your magazine. This proves that your magazine is of interest to the young as well as old.

LT. L. A. HALLOCK, USN
Instrument Flight Instructor
Fleet Air Service Squd. 8

Alameda, Calif.

AIR LIFT POSTSCRIPT

Am certainly disappointed in your article, "Pacific Air Lift" (FLYING, February). No mention is made of the magnificent amount of effort being put forward by Trans-Ocean Airlines, California Eastern Airways, Flying Tigers, Seaboard and Western, Sabena of Belgium and practically all of the regular commercial airlines here in the States who are making the Oakland, Fairfield-Suisun, Hickham, Wake and Haneda, Tokyo route daily.

They were called upon by the Government and authorized by the Department of Defense to push plasma, human blood, cargo, parts, etc., as the going got rough in Korea. Do them a favor and let them know that an ex-pilot of one of the above non-sched cargo carriers thinks that they deserve mention in the "Mailbox." Ask Cy Caldwell to make a trip with Cal Eastern. Good boys!

D. C. METCALFE

Omaha, Nebr.

P.P.S.

Cy Caldwell's article "Pacific Airlift" leaves me wondering whether the omission of the role that Rear Admiral W. G. Tomlinson and his successor Rear Admiral J. M. Hoskins have played in the Pacific Airlift as Commander, MATS, Pacific Division, was deliberate or just poor reporting.

Also, it seems inconceivable to me that any writer worth his expense voucher could do a story on MATS in the Pacific without even mentioning Navy Squadron VR-8, which has spurred the efforts of Air Force units considerably by their continual high performance.

I have no desire to see any controversy started concerning an organization that has Navy and Air Force units working together so harmoniously, but I feel that it must be pretty tough for the Navy men in MATS to read article after article that dismisses them and their efforts in one sentence.

LT. COMM. F. M. LLOYD, USN
Bureau of Aeronautics

Washington, D. C.

THE SURPLUS SITUATION

I wish to take exception to the statement made by H. C. Franke in his letter "Surplus Prices" (FLYING, March), to the effect that he is "promoting an interest in flying." I believe that Mr. Franke is really selling flying "down the river" rather than promoting an interest in flying. I agree with him that factory prices on parts appear to be high but they are high for two reasons: 1) the production volume of factory parts is low, due, no doubt, to the widespread use by plane owners of so-called "surplus parts"; 2) factory parts have been subjected to factory inspection and can be used with every assurance that they are airworthy.

While many surplus parts are, without doubt, good airworthy parts, there are many such parts which have passed through so many hands since their manufacture that their identity as airworthy or unairworthy parts has been completely lost. Thus it is possible to purchase "surplus parts" that were at one time actually rejects.

More important than this, as far as flying is concerned, is the fact that to sell a man on flying on the basis of the availability of "surplus parts" at low cost is to create a disgruntled flyer when the time comes that he must pay factory prices for parts. How much better it would be if every flyer became interested in flying with a full understanding of the actual normal costs of flying. Then, if airworthy parts were available at a lower cost, the flyer would feel that he had made a good deal—not that the cost of flying had been misrepresented.

FRANK H. HIGHLEY

North Canton, Ohio

AUTHOR APPROVES

Congratulations on your layout of my story, "Strange Field Take-Off" (FLYING, March). I thought the cartoon treatment was superb. Please convey my regards also, to Frosty for a job well-done.

WESLEY NEAL

Long Beach, Calif.

CORRECTION

In the February issue of FLYING, in an article by Mr. William Bullock it's mentioned that Mr. Ben Howard is General Manager of the Fairchild Aircraft Division at Hagerstown, Md. Mr. Howard resigned from our company about a year ago. We would appreciate it if you would call this to the attention of members of your staff who may not be familiar with this change.

J. ROBERT ROWLEY
Assistant Public Relations Manager
Fairchild Aircraft

Hagerstown, Md.

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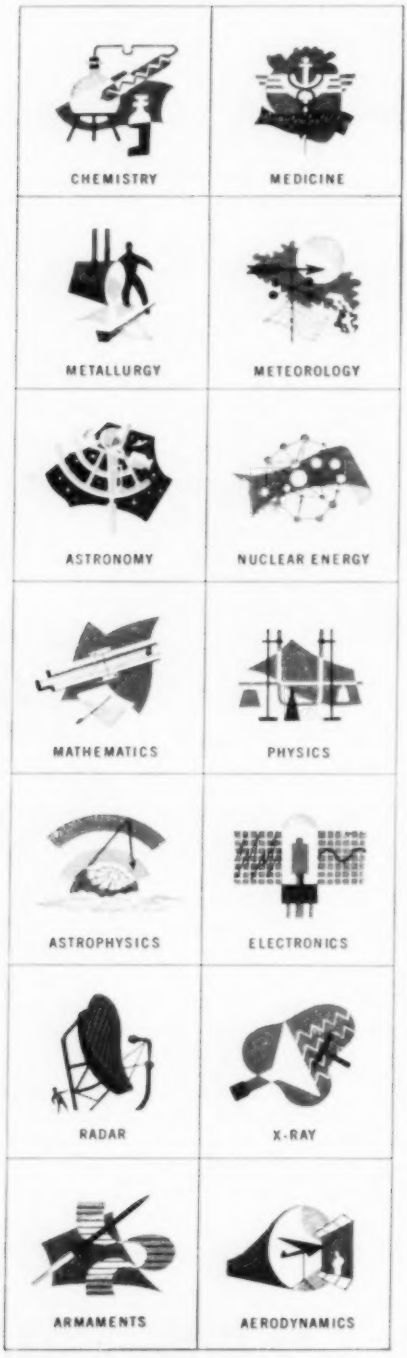

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As modern aircraft extend beyond sonic speeds and penetrate the outer limits of the atmosphere, new problems of design, materials, power, safety and pilot comfort arise, requiring the kind of scientific research facilities now found at Lockheed.

New buildings, providing laboratories in nearly every known science, have been added to Lockheed's Research Center in Burbank, Calif. Each building was designed for a special purpose. Each contributes to research, testing, invention or design —to help solve any new aircraft need or problem.

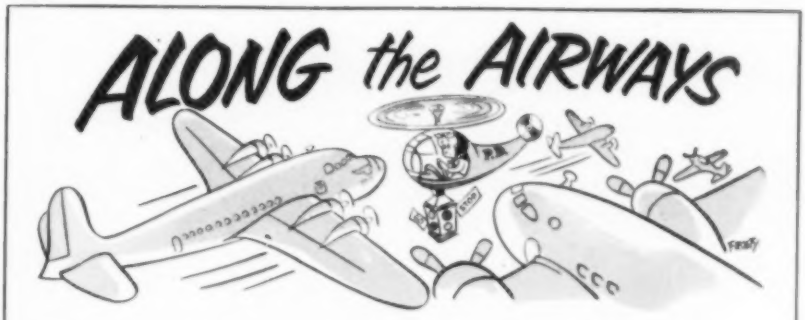
Lockheed's new 5-story Engineering Building, for example, houses a streamlined science headquarters, where engineers delve into such subjects as atomic research, pilotless aircraft, jet transports and advanced supersonic fighters.

SCIENCE CENTER

Lockheed advanced blueprints go to work in the new Research Center, which includes an aerodynamics laboratory, testing laboratory, wind tunnel, electronics laboratory, weather laboratory, chemistry laboratory and hydraulics laboratory. Here, meteorologists check the effects of every kind of weather on every vital plane part—shooting Sahara sand into engine bearings, growing tropical fungus on wiring, building Arctic ice on leading edges. These, and hundreds of other scientific tests, result in greater dependability in Lockheed planes.

Another advanced building at Lockheed is the massive Hall of Giants, which contains the nation's largest industrial equipment for building aircraft.

The new designs and methods which are developed almost daily at Lockheed are necessarily classified today. When they can be talked about, they will go down in history along with the many other Lockheed engineering firsts.



The U.S. scheduled airlines, domestic and international, have combined astonishing growth with an ever-improving safety record over the period of the past 14 years. In that time the number of miles flown has increased 562 per cent, passenger traffic has grown 19-fold, and the number of passenger fatalities per 100,000,000 passenger miles (the standard yardstick) decreased 60 per cent.

Col. Harry Coffey

Col. Harry K. Coffey, new president of the National Aeronautic Association, is a veteran aviator whose flying days date back to 1914. He learned to fly in one of the earliest Wright biplanes and took part in some of the first glider experiments. He flew his Stinson from Seattle to Point Barrow in the early '30s, when such a flight was a daring venture. Now a West Coast insurance executive, Col. Coffey is a QB and member of the CAP National Executive Board.

* * *

Government funds to finance the development of the "ideal" personal plane may be forthcoming, if Congress listens to the suggestion of the Aviation Development Advisory Committee of the CAA. Ten committee members are urging that a prototype of a personal plane be constructed to incorporate simple and practicable features that will decrease the number of accidents due to pilot error. The committee has pointed out that all prototype tests authorized to date have been for commercial type aircraft.

* * *

Air travel between the United States and Europe will boom this summer as never before, according to reports from the U.S. and foreign carriers flying the Atlantic. Tourists fares, being introduced by all transatlantic lines on May 1, brought a deluge of advance bookings as soon as they were announced. The Olympic Games, opening in Helsinki, Finland, on July 19 and continuing through August 3, will lure U.S. tourists by the thousands to the Scandinavian Peninsula, with Pan American and Scandinavian Airlines offering special service to the Olympics.

* * *

Do you have an opportunity to see many planes of foreign registry? And when you see them, do you recognize their nationalities by their letter codes? Vickers Inc., of 1463 Oakman Blvd., Detroit 32, Mich., has prepared a plastic card listing the most recent ICAO-recognized civil aircraft identification codes and will be happy to send you a copy of the card free of charge.

* * *

S. D. Murphy, Indianapolis manufacturer, has been named "Flying Businessman of the Year" by the Ryan Aeronautical Co., San Diego. Mr. Murphy's company operates three Navions and on a typical business day he will leave his Indiana base in the morning, pick up a couple of passengers in Atlanta, Ga., fly to Valdosta, Ga., for a business luncheon, then fly on to Jacksonville, Fla., for an afternoon conference. Retracing his route, he's back in Indianapolis well before midnight.

* * *

There isn't much that R. W. F. "Bob" Schmidt, manager of Tucson Airport, can't tell you about the airplanes and the pilots transiting his Arizona base. Since May, 1949, a questionnaire card has been filled out for every transient aircraft landing at Tucson. From the tabulated answers the airport management has learned where the planes have come from, where they're heading, what the air travellers think of Tucson service and hospitality, and the dollars and cents business brought to Tucson out of the air. The results of this continuing survey are the basis for planning effective promotional campaigns for the airport and its entire trade area.

* * *

The beginner pilot—the man or woman who flies a small plane with a minimum of instruments and no radio and who uses a plane mostly for pleasure—is the audience for whom the CAA has written a pamphlet entitled "Terrain Flying." Available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at 25 cents per copy, the publication covers the problems presented to flyers by terrains in every part of the U.S. The booklet takes the attitude that you can fly with safety over mountains, swamps, deserts and any other type of country if you do it right and follow the advice of those who have flown there before you.

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AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is "To make flying more useful, less expensive, safer and more fun."

Headquarters address is Box 5960, Washington 14, D.C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

AOPA ANNUAL REPORT

In the special AOPA Edition of FLYING, AOPA members have been given a complete annual report covering AOPA's 1951 operations. A few highlights:

Membership was at an all-time high.

AOPA's Flight Service helped plan and process approximately 1,650 flights during the year—a 230 percent increase over 1950. Of that total, about 550 were foreign flights, mostly to Latin America.

The AOPA Chart Service handled a total of 52,363 Sectional and WAC charts during 1951, an increase of 41 percent over 1950.

Through insurance services available exclusively to AOPA members, the average individual member's saving was $30 per accident insurance policy, $36 per aircraft policy, and $28 per life insurance policy. Total dollar premium savings to AOPA members during 1951 exceeded $200,000.

AOPA's Publications Department produced a total of 397,524 copies of the Confidential Newsletter during 1951, 173,661 copies of AOPA Special Reports, and a wide variety of other publications and informational matter for members.

BORDER-CROSSING

As this issue went to press, final agreement had been reached between the governments of Mexico and the United States on a new streamlined border-crossing procedure between the two countries.

Meetings were held in Washington between Mexican and U. S. officials, at which detailed operational plans for the new system were worked out. AOPA also participated in the planning.

The Mexican official representing his government on the project was Sr. Antonio Pastrana, vice president of RAMSA (Radio Aeronautica Mexicana, S. A.), non-profit company that owns and operates all Mexican radio aids. AOPA recently was appointed RAMSA agent in the U. S., and shortly will begin issuing RAMSA credentials from AOPA National Headquarters in Washington. For a flat fee of 20 pesos ($2.31) per month, AOPA members will thus be able to use most of RAMSA's facilities in Mexico at no extra charge.

The new border-crossing arrangements between the two countries will permit individual flight plans to serve as official notification of other government agencies concerned with border-crossing flights (Customs, Immigration, Public Health). Unlike the "one-way" system that has proved so successful on the Canadian border, the new Mexican system will be "two-way," thus serving both Mexican and U. S. pilots.

NAUTICAL MILE

AOPA is continuing its fight against the CAA's proposal to adopt the nautical mile as the standard unit of distance measurement by domestic civil aviation.

Contending that civil aviation was not properly represented when it originally was decided to adopt the unit, AOPA recently asked Charles F. Horne, CAA Administrator, to request the Government's Air Coordinating Committee to re-open the matter for reconsideration. The matter now has been placed on the agenda of the technical division of the ACC for further discussion. If that division agrees with AOPA's contention that civil aviation was not properly represented, and that the nautical mile will work hardship on domestic civil aviation—and in some instances actually create a hazard—then the matter will be referred to the main ACC committee for reconsideration.

IDENTIFICATION CARDS

AOPA has warned its members to get their CAA identification cards immediately, if they haven't already done so. Warning was the result of a call to AOPA National Headquarters by E. S. Hensley, director of CAA Office of Aviation Safety, who advised that his agents were starting to crack down in March.

It's now actually illegal to fly without identification card.

CUBAN BAN

AOPA's Flight Service reports flights of AOPA members into Cuba have dropped drastically since AOPA notified members that it was suspending flight routings to that country in all but essential cases. AOPA recently advised the Cuban government that it was suspending its routings into Cuba because of the exorbitant "fees" charged U. S. pilots by a wide variety of Cuban officials.

Since announcing its stand in the matter, AOPA has only routed essential flights into or through Cuba. Meanwhile, AOPA members in Cuba as well as in the United States have applauded AOPA's action; many have been sending National Headquarters additional "case histories" on Cuban flights. Members in Cuba are attempting to help solve the problem by working with their own government officials.

AOPA letters to the Cuban ambassador in Washington and to the Cuban Tourist Commission in Miami have gone unanswered.

Dirty Work At The Crossroads

Jerry Fairbanks makes motion pictures. He also makes a point. He passes up airports where they leave smudge marks on his windshield, dirty handprints on his engine cowling, and greasy rags in his cockpit.

Mr. Fairbanks is a veteran pilot. He flew from Burbank when it was a gravel path along the edge of an apple orchard. He has a heart interest in aviation. He helped build it.

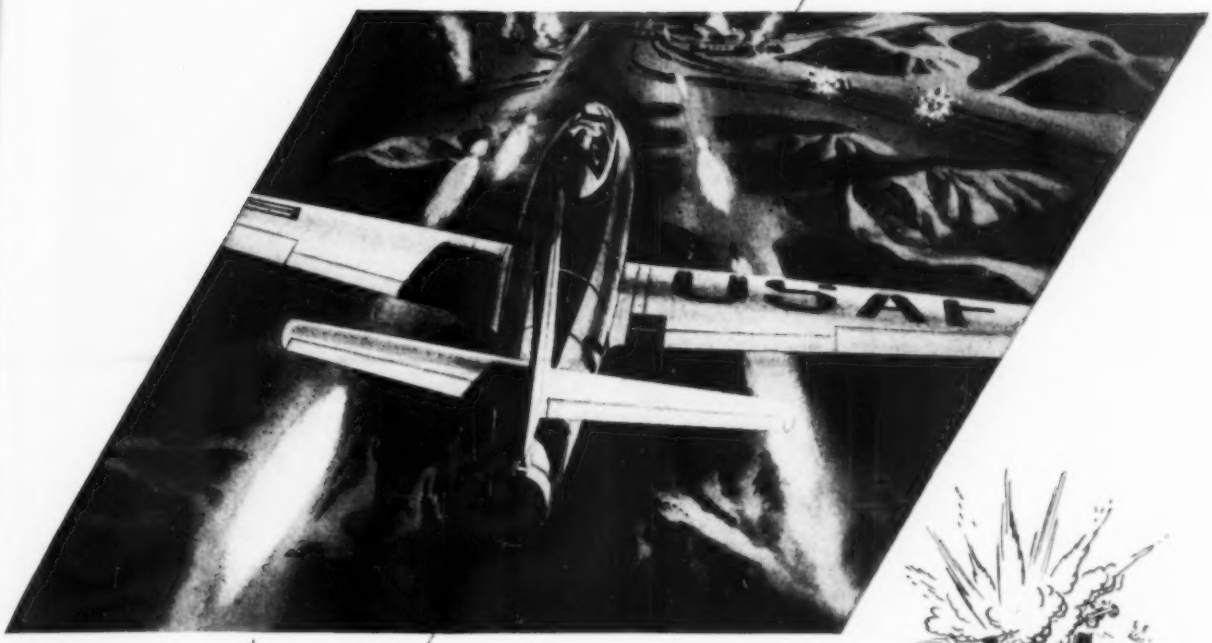
But Mr. Fairbanks is also a business man. He makes pictures all over the world. His twin-engine Beech is an essential of his business. He buys large amounts of gas and oil and pays many landing fees and hangar rentals as he prowls on his business trips.

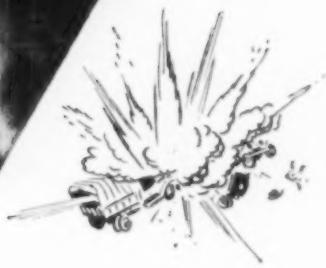
Jerry Fairbanks

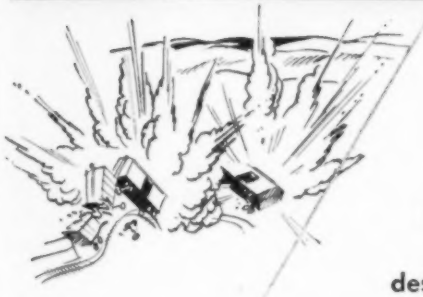
As a business man, Jerry Fairbanks is proud of his equipment—a great airplane, VHF radio, Lear autopilot, all the trimmings—luxurious transportation. He rejoices in the progress of aviation since he first flew Hisso-Standards and American Eagles. He pats the wheel of his Beech and feels the tingle of fun and pride run up and down his backbone. Personal flying is here to stay! He is sure of it. Then some yokel at some airport jars his pride and confidence by giving him the dirty-hands deal.

Oh, sure, he passes up that airport the next time he needs gas or service, but that is not the full story. It gnaws at him that anyone in aviation should louse up his equipment and not care. Jerry knows that an attendant who will leave dirt on a windshield may also leave a cotter pin unsaftied or a gas cap unfastened. Jerry's discontent with dirt is the essence of safety. END

INTERDICTION....







It's a fine word . . . it describes a great military concept . . . it is the use of air-power to strangle aggressor forces by destroying their supply lines. Interdiction isolates the fighting enemy from his support. ➤ ➤ ➤ Greatest effective weapon to wage successfully this phase of warfare . . . as a combat tested, fighter-bomber in Korea, the Thunderjet has proven its ability to carry out the multiple requirements of interdiction.

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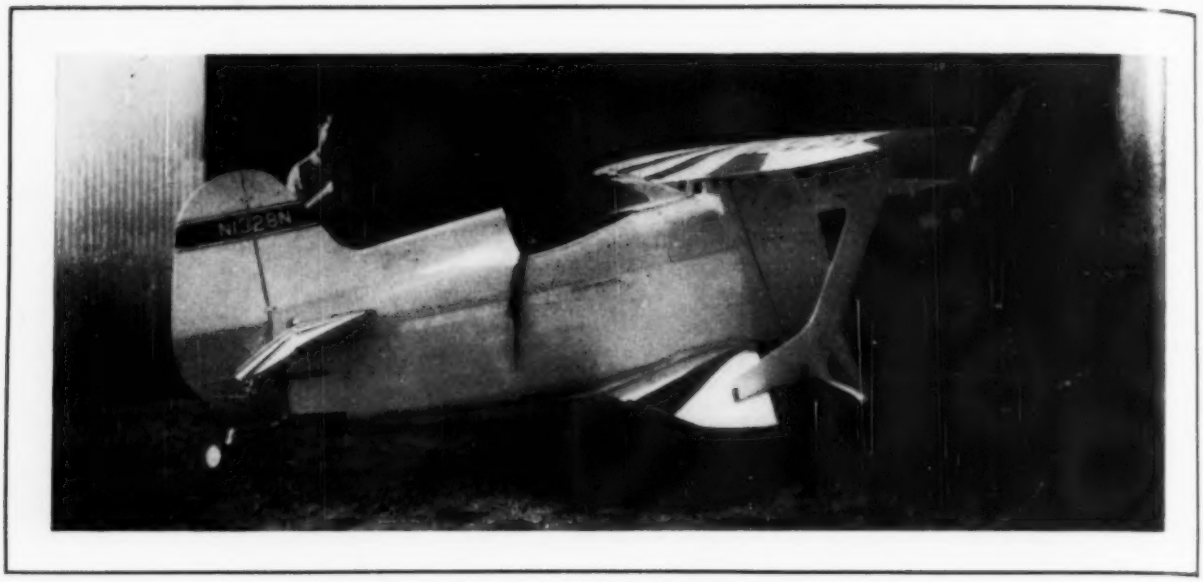

Walter Redfern and his Knight Twister

I got me a hobby!

By WALTER REDFERN, A.O.P.A. 4850

READING Betty Skelton's notebook in FLYING about midget planes, I said to myself, "That's what I want to do for a hobby." After hours of studying various plans, I decided the plane to build was a *Knight Twister*, designed by Vernon W. Payne. From him I bought the blue prints and most of the material. Almost a year later, after tedious hours of labor and vows of "never again," I had a ship I was proud to claim.

The top wing was 15 feet, bottom wing 13 feet, length 14 feet, power a Continental 85.

With about five hours of ground practice, the day came for the first flight. It was a nice day but to me very hot as the boys adjusted my shoulder straps. I had never before flown a midget and no one had ever flown this one. As I taxied to the end of the strip, which is 1,800 feet long, my mouth was so dry I couldn't even swallow and my hands were in a cold sweat. I headed the little plane down the runway, took a deep breath and opened the throttle.

The Midget leaped ahead and left the ground. The left wing dropped and I picked it up so fast I almost did a roll to the right. Up we went as though we were headed for the moon. I flew around for a half hour and came in for a landing at seventy miles per hour. This first landing was the best I ever made in my midget. As I crawled out of the plane I said to the fellows, "Nothing to it," but I sat down fast so they couldn't see my knees knocking.

I flew this little ship for seven hours and then one day as I passed over the end of the runway at about 300 feet my motor stopped. I dropped the nose, checked everything and couldn't see what could be wrong except that I had to land and do it fast. In front of me were trees and on the other side of the trees, a large field. That wheat field was where I wanted to get but those trees had me worried. With fingers crossed I pulled out the primer and pushed it in slowly and the motor started, giving me just enough speed to get over the trees and set her down. I landed with no damage to the midget. We towed the little plane down the road and back to the airport.

The next day we found the carburetor was not getting gas so we took off the filter and installed a different make. We ran a free flow gas test and more gas came out than the motor could ever burn. We hooked up the gas line to the carburetor and gave her a ground check and the motor ran as it never had before. I taxied around the field and everything seemed to be O.K. I took off.

Just as I got airborne, feeling confident we had found the trouble in fixing the filter, the motor stopped. I had very little altitude and this time there was no place to go, nothing but rolling hills. I looked as I never had looked before for a place to land. I missed a plowed hill by inches. Ahead lay a very small field with wires on the other side. I was too low to go over the wires so I had to land in this field. When my wheels hit, I knew I was going over. The ground had just been plowed and was soft.

Many things I had been taught came back to me. I acted almost mechanically—cut the switches, turned off the gas, and pushed my goggles away from my eyes. From then on the land and sky were all mixed up. Over I went and hit hard, upside down. The (*Continued on page* 64)

SPECIAL DELIVERY IN A RICE PADDY

Pin-point delivery in a Korean rice paddy... paratroop units with complete, fully-assembled equipment and supplies are ready for instant action... where no roads or airfields exist – tough, battle-proven Fairchild C-119's provide "Special Delivery."

Speed, stamina and versatility – key points of Fairchild engineering and design – have made the rugged, dependable "Flying Boxcars" the all-purpose transport for military airlift operations of the United Nations forces in Korea, and for other airlift operations in Europe and the United States.

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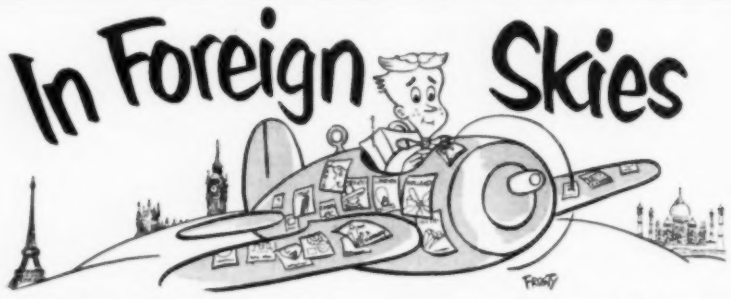
In Foreign Skies



A full-size, delta-shaped aircraft wing made of molded plastic will be attracting crowds to the plastics section of the British Industries Fair, scheduled for Earl's Court, London, May 5-16. The wing is hailed as a forerunner of the all-plastic aircraft, envisioned as easier to build than metal aircraft, and considerably cheaper. Work has already been started on plastic gliders and it is expected that delta-shaped plastic aircraft will be airborne within two years.

* * *

SIPA 200

France's SIPA 200, a two-seater private plane and trainer described as the smallest jet-propelled aircraft in the world, has been successfully test-flown by Roger Launay, test pilot for the Societe Industrielle pour l'Aeronautique. All-metal and powered by a Turbomeca Palas turbine engine, this baby jet is 17 feet long and has a span of 23 feet, five inches. Its calculated cruising speed is 236 mph, with a range varying from 280 to 435 miles depending on speed and altitude.

* * *

FLYING's "Military News" section for February cited a report from Lockheed that its T-33 trainer is used by more countries than any other type of jet. The howl of protest was loud and in detail. Readers Francis V. Pound of Harrow Weald, Middlesex, England, and Dennis M. Powell of Prestwick, Scotland, were among those pointing out that the de Havilland Vampire is really entitled to the most-widely-used title. The Vampire is standard equipment with the Air Forces and Navies of 13 (count 'em) countries: Great Britain, Canada, South Africa, New Zealand, India, Sweden, Norway, Switzerland, Italy, France, Egypt, Venezuela and Australia.

Mistral

Anent the same popular Vampire, word comes from the Marignane workshops of the Societe Nationale de Constructions Aeronautiques Du Sud-Ouest, where Vampires are being mass-produced for the French Air Forces, that several prototypes of the de Havilland pride are being tested here. Among these is the Mistral, powered by the Hispano Suiza Nene jet engine, which is reported as being faster and having a higher rate of climb than the Vampire.

* * *

Coffee is not the only thing they've got an awful lot of in Brazil. They're well equipped with Piper Super Cubs down Rio way, too. Eighty Super Cubs have been purchased by the Brazilian Government for use by aero clubs throughout that country. To encourage civilian flying among Brazilianos, the Government subsidizes aviation clubs by donating the planes and paying a part of the student instruction fees.

* * *

Dozens of Lancaster bombers, put out to pasture as long-range flying arsenals after World War II, have been converted for new peacetime roles at the Avro Canada plant. Among the Lancaster "re-treads" now in use are long-range navigational trainers, photo reconnaissance types which have done a fine job of mapping Canada's northland, air-sea rescue types, and one special plane which serves as a flying test bed for the new Orenda engines. In this model the two outboard piston engines were removed and two jets substituted to test their performance under flight conditions.

* * *

Viscount

A 215-pound rocket motor, using liquid oxygen and a mixture of water and methanol, has been used for take-offs by the British Vickers Viscount, first turbojet airliner, during tropical and high-altitude tests in Africa. Twenty-eight 40-passenger Viscounts are on order for British European Airways and are due to go into service on London-Rome-Stockholm routes within the year. Here the Viscount is shown taking off from Entebbe Airport, Uganda, three miles from the equator.

I Learned

(*Continued from page 36*)

Three days later, I returned and flew the ship out of the once more hard-frozen field without difficulty.

What did I learn about flying from this experience? First, I learned that careful observations from the air are not dependable without accurate knowledge of incidental circumstances related to the situation. Where this is not available assume the worst possible circumstances to add to what you see, and a safe, if perhaps overly conservative, conclusion will be reached. The lack of ruts on an active airport means one thing; on an inactive field, possibly the opposite.

Second, when you plan to fly to areas with which you are not familiar, to use strange airports that are not known to be all-weather fields, check the surface weather forecast as well as flying weather. Had I checked the surface forecast for temperatures, I would have detected the possibilities of a thaw and planned to use only a hard surfaced field.

Third, when it is determined that a grass, gravel or dirt field must be used for one reason or another, do not fail to consider carefully the characteristics of your ship, whether or not those are compatible with the field conditions. The Swift is a clean, fast, economical ship, but should be used only on hard-surfaced, well-cut grass or well-drained, dry gravel runways as weather conditions permit. On the other hand, had I used a slower, high-winged plane, I would probably have gotten in and out of the field in spite of the mud.

Last, and more basic, avoid asking non-flyers for advice on matters concerning flying. If this cannot be avoided, do not fail to weigh their statements according to their experience. Even though I asked the individual concerned specifically about the type and condition of the field, his lack of knowledge rendered him incapable of other than a misleading answer. Anyone who had flown out of the field in question would have warned me away from its use. END

Ohio Project

(*Continued from page 15*)

have been involved. Grimes Manufacturing Company of Urbana, Ohio, donated building space, as well as time and materials. Ohio State University has made faculty help available.

The *OP* is scheduled to fly by spittlebug season (mid-April) and should be laying fog over Ohio during the current growing season. Like the AG-1, the *OP* will not be put into production but will be certificated as an NR aircraft. Drawings will be complete so that you or I can build the same plane with a minimum of cost and time. Drawings will be made available to any and all at nominal expense. The *Ohio Project* typifies what can be done when private citizens and government get together, and for this as well as other practical reasons is notable in aviation development. END

"AOPA MEMBERS ARE FRIENDLY FOLKS!"

Take advantage of AOPA's many benefits. AOPA's active membership plan now gives more and better service to active pilots than ever before.

Says STEVEN PHILLIPS
AOPA Member 61632

"AOPA members are friendly folks! My job of sales promotion and public relations takes me all over the country. Naturally, my favorite means of travel is in my own airplane. Wherever I go, the AOPA wings in my lapel are recognized instantly, and I find many new friends in this way. It's like belonging to a nation-wide hospitality club. I would not feel dressed if I did not wear my AOPA wings. I am proud of my association with AOPA, happy with the many friends I have found through it, and never lose an opportunity to point out the many benefits a pilot can enjoy by joining AOPA."

Steven Phillips has been active in aviation since 1927. His first venture was building a primary glider using plans imported from Germany. Later, he built many gliders and sailplanes and still loves motorless flying. As an executive of the John G. Marshall Company, manufacturers of photographic chemicals, he now spends many hours in the air in his own Cessna. Steve's work takes him to all parts of the country and the use of his airplane helps to cut many hours from his travel time. Steve says, "I treasure my membership in AOPA highly, and I never lose sight of an opportunity to boost it to other fliers. The private pilot would be at a great disadvantage were it not for the ceaseless efforts of AOPA in his behalf."

- Brand new lapel insignia and credentials!
- Aid of the Washington staff of AOPA in your personal flying problems, CAA licenses, regulations, legal difficulties, documents, employment, etc. Specialized services including map subscription service, aircraft title search, flight routing, etc.
- A $700.00 personal accident policy (flying only) issued by AMERICO to all ***active*** members without cost. Increases $100.00 each year your membership remains in force until principal sum reaches $1,000.
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- Participation in advantageous insurance coverage available through AMERICO and in the Minnesota Mutual Group Life Plan.
- Hertz Drive-Ur-Self and TWA Courtesy Cards.

Full ***active membership*** in AOPA is available at only $10.00 per year—less than 3c per day. The personal accident insurance alone has a value of $3.50 the first year, increasing to $5.00 for the fourth and every ensuing year. 30c of the ***active member's*** fee is paid to the AOPA Foundation, Inc. for air safety and research. (Those who do not wish to make this voluntary contribution to air safety may remit $9.70 in lieu of $10.00.)

Enjoy membership in the world's largest and friendliest pilot group which continuously protects and fights for your flying interests in government and other circles.

AOPA operates on a non-profit basis and is dedicated to the advancement of private flying. Use this coupon now!

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I would like to apply for membership in AOPA as indicated.

I first soloed an airplane at .....in the year.....

I own aircraft.....Make.....Model.....

Name.....
(please print)

Address.....

City.....State.....

Pilot License Number.....Ratings.....

Signature.....

($1.80 of each year's dues are for my subscription to the AOPA edition of FLYING)

☐ I desire ***Active (Full) Membership*** in AOPA. Enclosed find my check or money order for $10.

IMPORTANT

I understand that I am to receive a $700.00 flying-only personal accident insurance certificate issued by American Mercury Insurance Company. (Restricted to the U.S., its possessions, Canada and Mexico.) Please record the following person as my beneficiary for this insurance

.....
Name of Beneficiary Relationship

REGULAR (LIMITED) PILOT MEMBERSHIP

for those pilots who do not require the full services of the AOPA due to their flying inactivity, military service or other circumstance, ***Regular Membership*** is available at the low rate of $5.00 per year. This plan is ideal for those pilots whose servicing requirements are limited but who wish to support and be affiliated with AOPA. Benefits are limited. Member will receive standard lapel pin, membership card, the AOPA edition of FLYING magazine each month, and may participate in insurance available through AMERICO and the Minnesota Mutual Life Plan. (Automatic personal accident policy issued at no cost to ***active members*** is not available to regular members, nor is the AOPA Washington Newsletter.)

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Women and Security

(Continued from page 13)

feet, Dunham's plane lost a canopy seal and with it the all-important cockpit pressurization. He began to get the bends and both pilots dropped to 32,000 feet. Thus their potential range was lessened though they still had sufficient fuel to continue to Turner, IF the forecast weather held.

Midway between Birmingham, Ala., and Turner, with the radio compasses in both planes giving erratic readings, the pilots contacted the Turner control tower for a DF "steer." The first two "steers" transmitted were unreliable due to local static. The Airdrome Officer then took over and informed the pilots that weather at Turner was down to 400 feet, with scattered light rain and fog, one and one-half miles visibility, and a solid overcast at 2,400 feet.

With this information, Schilling turned to pick up a westerly heading for Maxwell. As soon as his turn was initiated his flight indicator tumbled, registering a 20-degree climb while he was losing 2,000 feet per minute. He called to Dunham to take the lead.

A call was put through to Maxwell tower where Sgt. Shoemaker had been monitoring the conversation with Turner. Promptly she gave them the DF range frequency, identification of signals and weather conditions, arranged a priority let-down and summoned a crash crew to stand by in case of emergency. Within a few minutes Col. Schilling and Lt. Col. Dunham had landed safely. Minutes after that, both pilots were in the control tower to thank Sgt. Shoemaker and the rest of her crew for a job well done.

Control tower work is an exciting job that calls for coolness under pressure and split-second decisions that oftentimes save lives. It's work at which smart, service-trained women specialists like Eileen Shoemaker excel.

Women serve with equally spectacular success as cryptographers, intelligence specialists, plane dispatchers, weather observers, "blind" flying instructors, photographers, air traffic analysts, radio mechanics, interpreters, photo mappers and parachute riggers, just to cite a few fields. WAVE Eva May Harvey last year became the first woman parachutist in any of the armed services when she qualified for her rating as PR3 after her sixth parachute jump at the Naval Air Technical Training Unit at Lakehurst, N. J.

Technical and professional training courses, ranging in length from six to 45 weeks, are conducted for women in service, and all branches are perfectly willing to train their specialists. Only occasionally do the recruiting officers come across an applicant who has received thorough specialized training as a civilian.

Such an exception is Lt. Genevieve Koester, USN, head of the Civil Airlines Section of the Navy's Civil Liaison Branch. As a civilian, Genevieve was a research associate in the field of guided missiles in the University of Michigan's aeronautical engineering department. She holds a commercial pilot's license and is the only woman ever to serve on the committee which writes the air rules governing civil aviation. Now on duty in Washington, she will leave soon for a new assignment with the Commander-in-Chief of the Pacific Fleet, with headquarters at Pearl Harbor.

Women in service, restricted during World War II in the geographical areas to which they could be assigned, are now on duty at American Bases the world over. They're on the job in Germany, Japan, France, various Pacific islands, and at other overseas stations where suitable facilities are available. The only billets from which they are barred by law are combat jobs of all descriptions and jobs requiring a high degree of physical strength, such as the lifting of heavy automotive equipment.

Aboard aircraft women serve as flight attendants as well as in the role of flight nurses, while shipboard service for women is still limited to the Navy's nurses. And there just isn't any limit to the heroic work being done by these flight nurses.

Since 1943 nearly 2,000 members of the armed forces' large corps of nurses have won the silver wings that distinguish them as registered flight nurses of the Air Force or the Navy. After a rigid training period at the U. S. Air Force School of Aviation Medicine at Gunter AFB, Alabama, the flight nurse knows how to treat a thousand and one ills aloft while she transfers her patients from the care of one doctor to another. En route she is also a dictionary of aviation terms, a weather bureau and an expert on aircraft—the last word on everything to her airborne patients.

More nurses, as well as more women to serve in all branches of the armed forces, are urgently needed, now. The immediate goal is for a total of 112,000 women to be on the job by June 30, though the Department of Defense admits that it will take all the women it can get.

Secretary Lovett has said that the young women of America, if they volunteer for military service now, can well swing the balance between security and disaster for our country. It is unthinkable that our women will fail to measure up to their nation's need. END

"Flaps down . . . Hold your airspeed . . . Blab, blab, blab . . ."

Lost Air Policy

(Continued from page 11)

annual Exchange programs, we have come to learn that America does not necessarily lead in all things aeronautical. Switzerland, Sweden, Brazil and Denmark, among others, have shown us civil aviation at its best. In these countries, in Europe generally, private flying enthusiasm and participation have been achieved on an almost universal scale through the medium of *motorless flight*. Gliding and soaring come into the lives of these people early and remain with them throughout the years.

There is an obvious conclusion to be drawn from these findings abroad and from Gill Robb Wilson's editorial. We have neglected the many facets of private flying in our quest for U. S. air supremacy.

Civil Air Patrol seeks to give civil aviation its rightful role in the true air power picture of this great nation, with youth the central figure. Our air heritage, enhanced by 48 years of inspired leadership, must be fostered and passed on to new generations. END

They Call It TAC

(Continued from page 23)

Tac's second mission is interdiction, or as it is often called, isolation of the battle area. These profitable operations are accomplished in a number of ways against enemy reinforcements and lines of supply. Fighter-bombers prowl for targets of opportunity—truck convoys, armor on the move, trains, or troop concentrations. Light bombers and fighter-bombers—and sometimes even the medium bombers—hit bridges, tunnels, marshalling yards, road junctions, supply dumps, and other logistic targets. And again, this mission is assigned to Tac because no weapons of the surface forces—most targets of this sort are far beyond artillery range—can do the job as well, if at all. Interdiction is Tac's most productive activity. Resulting isolation denies the enemy access to, or movement within, the battle area. Moreover, interdiction bleeds the enemy white—and this is exactly what we are doing so successfully against the Reds in "Operation Strangle."

The Joint Chiefs of Staff advance a very logical and interesting reason for their tactical doctrine. They say, in effect, "Destroy enemy targets as soon as possible after they are discovered. By imposing deep interdiction you hit enemy build-ups where targets are easier to find and hit. Bomb for bomb, you destroy more materiel and personnel before they have opportunity to disperse. Battlefield interdiction is imposed at the points along which dispersion to various front-line units is beginning. Knock out the enemy here before they become targets for close support—this is, targets critical to the front-line GI. Once the targets are spread out on the battlefield, or emplaced along the front, lines well dispersed and camouflaged, fewer men can be killed and fewer weapons destroyed by a given number of air missions."

Need for close support decreases in direct proportion to Tac's ability to follow this battle prescription. If Tac Air could carry out perfectly the doctrine of interdiction—destroying the enemy before he came to grips with our GIs—there would be no need for any close-in support. This is the goal toward which the Tactical Air Command is striving.

Rarely, however, do circumstances permit any tactical unit to achieve theoretical perfection. It did happen once or twice during World War II. The character of Korean terrain and the nature of the enemy make circumstances most unfavorable in the case of the FEAF. There is considerable "leakage" of men and materiel through the battle areas, particularly at night. Thus, close support becomes necessary with regularity.

Col. Dan Ritchie, Tac expert in USAF Operations (Pentagon), explained: "In the early days, Tac had to concentrate on close support. We gave immediate aid to the troops at the expense of more profitable interdiction targets. I recall an instance where a division had only ten batteries of artillery along a frontage of 37 miles. Moreover, their ammunition had been rationed by G-4. Tac had to pitch in with these guys, doing what would normally be the job of divisional and longer-range corps artillery. We had to save those men. And it happened that we had more bombs available than they had ammunition.

"Today, it's another story. Ground troops have the artillery and ammunition—so we don't have to substitute for guns against artillery targets. In close support now, we operate against targets which the artillery cannot reach. Meanwhile the pay-off—interdiction—rocks its rugged way across aggression and holds Korea against forces which might be overwhelming if left to their own devices until they reached the battle lines." END

Airport-Motel-Cafe Proves Profitable at Skyhaven

Skyhaven Airport, three miles west of Warrensburg, Mo., has solved the problem of keeping a small civilian airport's ledger in the black after G.I. training program funds have been withdrawn. Taking advantage of the airport's location on busy U. S. Route 50, the owners spent $200,000 to erect a modern motel and restaurant adjacent to the three sod runways, the tie-down area and the aviation fuel gas pumps. Whether guests arrive by plane or by car, they'll find all the ingredients of a good meal or a comfortable overnight stop provided at Skyhaven.

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High Enterprise

(Continued from page 27)

demonstration.

Note that "thrill and chill" acts were conspicuously absent. Stunt flying would have been a direct violation of the theme of the show, and as it turned out, wasn't needed. For as De Ville looks back on it now, he says, "One thing, I think, that stands out in my mind more than anything else is the fact that you can get people out to a show like ours without putting on acrobatics." The attendance figures seem to agree.

Fred Bailey meanwhile was enticing all the private pilots in the state with a promise of free coffee and doughnuts for everyone until noontime, with prizes for the oldest and youngest pilot and for hidden arrival times. Bailey's invitation went out in the form of a small poster—with complete details—all ready to be put on the local bulletin board.

Then, a week before the tour, the committee lined up Preview Flights for more than 100 radio and press personnel, as well as the city fathers, school board officials, and police commissioners. For these flights, as it has for many others, the Standard Oil Co. furnished its *Lodestar* and pilots. The Timken Roller Bearing Co. donated a Twin Beech and pilots. The rest flew in the Aviation Board's Cessna.

Publicity Pays

"These Preview Flights," says De Ville, "were one of the main reasons why we got the publicity we did—publicity that paid off." De Ville can back up his belief that such publicity is of tremendous value. Canton, where De Ville pushed every publicity angle as hard as he could—harder than did Jenkins in Akron—supplied 345 of the 412 people who took the tour.

Planning Flights had meanwhile been made and the tour route laid out. Under Burwell's guidance, the committee elected to offer two routes—one north and one south—covering 16 points of interest apiece. Points the committee marked included the new Akron Expressway, a new shopping center, and the abandoned land on the outskirts of Canton. Also the Lee Gamauf farm where contour strip cropping had kept the fields richly green and the Marvin Cook farm where a diversion terrace and a new tile system regulate drainage.

Rural points of interest were included in the urban tour because the relationship of the farmer to the city-dweller is one of vital importance—even though many people don't realize it until they see it from the air.

Modest Fee

For planes and pilots for the tours, Fred Bailey contacted Air Services, Inc., and McKinley Air Transport, Inc., of the local airport and the satellite airports at North Benton, Mansfield, Magnolia, and Stow. He asked for four-place Stinsons and Cessnas—"Visibility is better than in the big jobs"—and offered the pilots exactly as much as the committee was charging for tour tickets—$3.00. At that rate, each pilot grossed $15.00 per flight hour.

The day of the tour was cloudless. The air was smooth and visiting pilots began dropping in before the scheduled 9 a.m. hour for the first tour. First stop was to register and to pick up free tickets for coffee and doughnuts from Mrs. C. A. A. Hulseman of the Akron Women's Chapter of the National Aeronautic Association, one of the 16 agencies that were finally contacted to help run the tour.

There was a hum of activity on the field even though many of the displays and mock-ups asked for by De Ville and Jenkins were unavailable because time had been so short. A model plane contest, the air-sea rescue by the CAP, and the crop dusting exhibition drew and held the crowds of people who, by the way, had come in free of charge.

Backing Act Popular

All the airlines that use the Akron-Canton Airport held open house and American and Capital set up a public address system to publicize the tours and to give basic data on each commercial plane as it landed. Biggest hit was the *Convair* which used its reversible pitch props to back away from its loading zone.

In the quiet of the main building, the Stark and Summit County Soil Conservation Officials were briefing the passengers for the big event—the air tours. They explained the purpose of the tour—"To see aviation in operation and to see your city face to face"—told the passengers what they would see, and showed them on aerial photographs how to recognize it.

Then, armed with a booklet which included a map of the tour, the passengers were ushered directly to their planes by members of the Chambers of Commerce. Engines were cut for loading and unloading. As an added safety precaution, the crowd was kept behind a barrier.

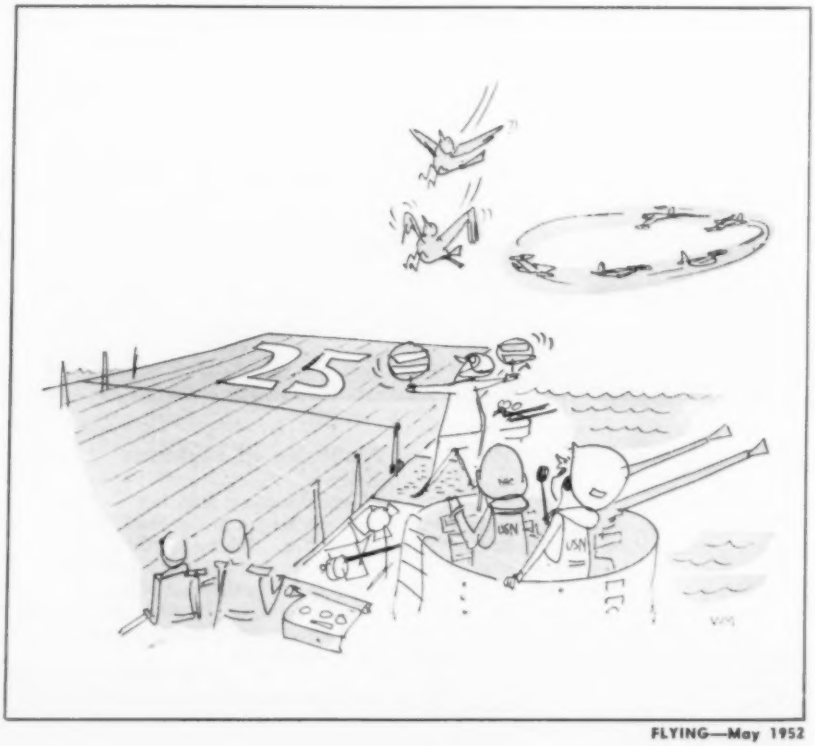
Full Schedule

As the day wore on, the pilots reduced their loading and unloading to a smooth routine. On other parts of the field, the exhibitions and special events, such as the presentation of the Eddie Rickenbacker Trophy to Lt. Paul Beitzel of the Canton-Masillon CAP, went smoothly, too.

De Ville and Jenkins realized that next year's fair would require even more planning than had this one. First, the committeee would have to begin planning much sooner. Second, they would have to line up bigger and better ground displays—"an aviation midway" Bailey calls it. Third, they would have to get more planes for the tours, for hundreds of passengers had been turned away.

What did those passengers who took the trip, most of them first-timers, get out of their half hour in the air? First reaction almost always was, "I didn't know flying was so smooth." Next, "It was just like the man said. The farms and streets looked just like in the pictures." Or, "It was the most exciting trip I ever took."

The passengers were enthusiastic about flying and had learned something about their own city. More important, these people who had never set foot in an airplane before, had gained an awareness of the airplane as a means to an end—as an instrument for accomplishing man's work rapidly and efficiently. Finally, they had lost some of their natural fear of air travel. In the words of Ray De Ville and Akron-Canton's air fair theme, they saw that "Aviation Is Safe and Practical." END



LOGGING TIME

WITH HY SHERIDAN

Captain, American Airlines

PARADOX

It's a funny thing but, internationally speaking, oil seems to cause a lot of friction.

* * *

AT HIS WORD

Stewardesses are given a little instruction about airplanes so that they can answer the questions of the passengers. The instructor in the classroom held up an exhaust collector ring and asked Sadie if she could name it.

"Sure," Sadie answered.

"Well, go ahead," the instructor advised.

"Sweetie Pie."

"Sweetie Pie? For the love of Pete!," the instructor cried.

"Well, you asked me to name it, and I thought that Sweetie Pie was a cute name."

* * *

TRUE ENOUGH

A man in a job that is too big for him sure rattles, doesn't he?

* * *

NOW WE'VE SEEN EVERYTHING

I see by the papers that the Army has produced a gun that shoots around a corner. Presumably they have right-handed and left-handed types of guns, depending on whether the corner is to the right or to the left. This fine effect is achieved by curving the barrel. The idea is not new, however, for I saw Harry Langdon with one that he made for himself. At that time he was a comedian playing the Orpheum circuit.

Maybe, on second thought, they won't need two kinds of guns, right-handed and left-handed. If a soldier has a gun that points to the right and he comes to a left-handed corner, all he has to do is stand on his head.

It's interesting to wonder how they bore that curved barrel. It doesn't seem likely that they made a straight barrel, bored it and then bent the barrel, because the hole would hardly stay nice and round. Sadie says the thing is simple. They just took a bent hole and made the barrel around it, but I dunno. I wish somebody would tell me.

And did you stop to think how this gun kicks? How does it, anyway? When the bullet gets to the middle of the curve of the barrel it is going pretty fast and changing direction quite rapidly, so the centrifugal force must be considerable, and the angular acceleration must be high, and this increasing, too. One of my favorite scientists, who acts as barkeep in his spare time, says that if you shoot a gun like that from the shoulder you'd have to wait before you pulled the trigger again—wait to stop spinning. I wish somebody would tell me about that, too.

You see, gentle reader, the purpose of having a gun that will shoot around a corner is to allow the shooter to stay out of sight of the enemy and still shoot at him. Personally, such a gun would be of no use to me. I solved this problem satisfactorily, at least for myself, in World War I. When I had two impulses—to shoot at the enemy and to stay out of sight of the enemy—I always gave in to the latter.

One kind of curved barrel gun does appeal to me, though. That's a gun whose barrel is not a quarter circle, as the present gun is, but a half circle. It would have the barrel curve upward in a half circle so that the muzzle is pointing to the rear. I could use it for retreating.

* * *

HAPPYTAPH

Joy Miller of Seattle, Wash., liked the March Epitaph on Willie, but didn't go along with the "line of reasoning." Her amended version follows:

If Willie didn't do
What he ought to of—
I doubt very much
He got in up above;
If he wouldn't conform
Then this I know—
The odds are heavy
He wound up below!

* * *

MAN OR BIRD?

The reason that children are so often witty, I think, is that they are so much more fundamental than the rest of us. It takes a lot of experience to get as stupid as the average adult.

Harlan D. Yates of Daly City, Calif., sends in this little gem.

Mrs. Yates was taking care of six-year-old Dianne, daughter of a neighbor. The little lady was aware that someone was coming to dinner at the Yates' house on this night in question. While preparing dinner, Mrs. Y. mentioned to someone that "Coop," a family friend, was coming to dinner, and Diane interrupted; "I thought that a man was coming to dinner?"

"He is, darling," said Mrs. Yates. "Coop is the man."

"He's no *man*," Dianne pointed out. "He's a PILOT."

* * *

OVERSIGHT

The trouble with the modern airplane is that the manufacturer builds them un-equipped with intelligence. You have to furnish that yourself.

* * *

OVERHEARD IN THE LOUNGE

"I'm from Texas and I just hate to be cooped up in a small state like Illinois."

HIGH SCHOOL GRADUATE
BILL SMITH

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Rotary Wing

(*Continued from page* 32)

by a sideward pushing propeller mounted on the rear of the fuselage. This propeller was directly connected to the main rotor by shafts and gears so that as the main rotor was speeded up for more lift, the tail rotor also speeded up and effectively offset the torque created. The pitch of the blades of the tail rotor was controllable, connected to rudder pedals, and thus provided directional control. This type of helicopter in which a tail rotor is used to offset torque is called the *anti-torque tail rotor type*, and is the most popular type in use today. It has been used on all subsequent Sikorsky designs, and is also used by Bell, Hiller, Doman, Siebel, Bristol, Saunders-Roe, and a few French and Canadian designs.

Sausage Style

Most popular of the two-rotored types is the *tandem*, where a main rotor is located at each end of a long fuselage. These rotors turn in opposite directions, and so each offsets the torque of the other. Piasecki's *Flying Bananas*, as they are dubbed, have proven that this type is easily adapted to the needs of large transport helicopters.

In *laterally displaced types*, the two rotors are located at the ends of two long arms that extend outward from the sides of the fuselage. However, the excessive weight and drag of these arms, and the heavy gearing in the gearbox below the rotor hubs, have made this type virtually extinct.

By placing the hubs of the two rotors side-by-side and close together, and gearing them so that the blades of one do not strike the blades of the other, we have the *intermeshing type*. The only American intermeshing designs now flying are the highly maneuverable Kaman helicopters. A modified and improved version known as the HTK-1 is now being mass-produced for the Navy.

Turbine Power

Of interest, too, is the unique Kaman control system. The cyclic and collective pitch control sticks are connected through push rods to a small airfoil located about two-thirds of the way out on each blade. Changing the angle of this servo-tab, as it is called, causes it to twist the very flexible blade, thereby achieving the same effect as other helicopters which use mechanical pitch changers. The Navy Kaman K-225 is the first helicopter to fly with turbine engine. Tests are now being conducted on this ship powered with the Boeing XT-50 gas turbine engine.

If the hubs of the two rotors are placed one above the other on a common shaft, the *co-axial type* results. Here, too, as in all two-rotored types, each rotor turns opposite to the other, cancelling out torque. Stanley Hiller's early experiments in rotary wing craft were on a co-axial design. Presently flying is the large Gyrodyne GCA-2C, powered by a 450 hp Wasp engine and capable of carrying six persons. This ship was once used for convertaplane experiments and had two 100 hp engines driving tractor propellers mounted outboard of the fuselage. Higher forward speeds were realized, but as this design is still under development, no figures have been released. The GCA-2C, minus its outboard engines, is now being evaluated by the Navy as a co-axial helicopter for general utility work.

Jet Eliminates Torque

In all the types so far discussed, torque is overcome by counteraction—this is, by the sideward pushing tail rotor, and by the oppositely turning rotors of the bi-rotored types. The *jet-propelled types*, in most cases, have small light-weight ram jet or pulse jet engines located at the tips of the rotor blades. These engines drive the rotor system in something like a Fourth-of-July pinwheel. This method does not counteract torque, rather it eliminates it altogether. The only fuselage reaction to the turning of the rotors is due to the friction in the rotor hub bearings. In this it is interesting to note that the fuselage tends to turn in the same direction as the rotors, rather than in an opposite direction as in all other single rotor types. This action is very small, however, and is easily controlled.

The French SNCA-Sud-Est Ariel II and Ariel III have blowers to compress air which is then forced through the rotor blades. This compressed air is mixed with fuel in the rotor and ignited, the exhaust coming out of an orifice at the blade tip in a jet action which drives the rotors. In the gigantic Hughes XH-17, two G.E. TG-180 turbo-jet engines are used with four afterburners providing jet action in each of the two rotor tips. In all of these designs the basic idea is the same—jet action at the blade tip drives the rotors. Keep your eye on jet helicopter developments. It is the belief of many that future large transport-type helicopters will be jet powered, as the size and weight of the shaft and gears of present piston engine designs will be prohibitive.

Coincident with the problem of torque are problems of vibration, control, structure, weight and powerplants, but it is the designers' various solutions to the torque problem that give us the several helicopter types we have today. Perhaps different schools of thought will someday compromise and we will have a "conventional" helicopter. On the other hand, it is possible that helicopters will never develop into a single type due to advantages of one type over others in varieties of work.

We have seen the birth, and are now watching the evolution of the helicopter. Through its growing pains, it will be interesting to see which ideas will be retained and which discarded. Whatever shape it takes, the helicopter is not just another aeronautical experiment. It has found a broad place in aviation, and may some day find a place in our everyday lives as a motor vehicle for the average man and his family. END

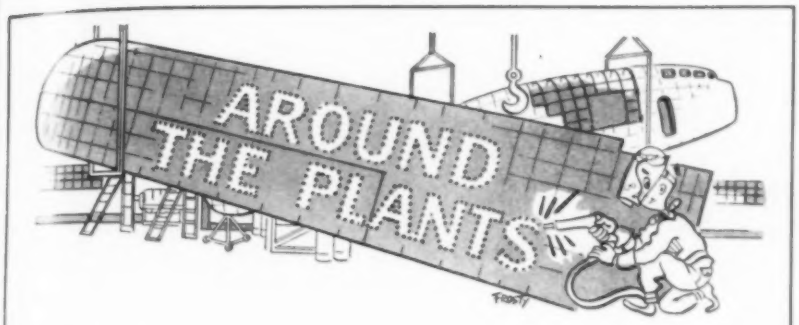
Off to the Races

(*Continued from page* 33)

one covering altitude and distance for pilots who wish to examine the track from the air.

In past years minimum altitude around the track has been 1,500 feet, a periphery of 1,500 feet, and all traffic turning to the left. The CAA office at Indianapolis expects no change in these figures this year but final decision is not yet announced.

In past years Cook Municipal and Shank's Field have accommodated the bulk of Memorial Day air traffic in approximately equal volume, due to nearer location to the Speedway. END



Two Flight simulators, reproducing the cockpit of the B-50D bomber, have been built by the Curtiss-Wright Corp. at Caldwell, N. J., and turned over to the Air Force for use in training the crews of the big bombers. The same Caldwell plant is also producing simulators for the B-36 bomber, and the C-119, C-124 and C-97 cargo planes.

* * *

On the subject of simulators, engineers at Link Aviation in Binghamton got into a summary state of mind on a recent day and made a list of the items involved in the production of the electronic B-47B simulator. Link's training counterpart of the Air Force's Stratojet involves: 7,500 engineering drawings; 40,000 square feet of tracing paper; 22,500 square feet of sepia paper; 70,000 square feet of white print-blue-line-paper; 130 instruments; 700 electron tubes; 66 motor-generator sets; 25 miscellaneous motors; 250 transformers; 4,000 resistors; 300 precision and 200 carbon potentiometers; 600 AN type connectors; 200 toggle switches; 1,000 gears; 250 relays; 170,000 feet of wire; air conditioner to cool, and power to heat, a six-room house; 380 computer assemblies. Put it all together, and you've got one 16,000-pound B-47B jet simulator.

* * *

Still in the realm of big figures, a 13,200-ton extrusion press, capable of exerting 3,000,000 pounds of pull, is due to be installed at the Lafayette, Ind., plant of the Aluminum Company of America. In the extrusion process, a hydraulic ram forces a heated aluminum billet through a die opening—just as you squeeze toothpaste out of a tube. The new press squeezes with a force equal to the weight of 156 loaded coal cars. The result will be improved production of the many intricate aluminum shapes required for aircraft.

* * *

The Aero Commander, twin-engine executive transport priced at $66,000 and built by the Aero Design and Engineering Co., Oklahoma City, is in full production, with 100 of these 200 mph planes scheduled to be airborne by the end of 1952. The first Aero Commander made news when it flew from Oklahoma City to Washington, D. C. on one engine after removing the second propeller just to prove that it could be done.

* * *

An airplane nacelle made entirely of stainless steel, instead of the traditional aluminum, is being produced by Solar Aircraft Co. of San Diego for the Lockheed P2V-5 Navy patrol plane.

* * *

Flight tests are now in progress on the new Piper Twin-Stinson, low-wing, twin-engine executive plane that the Piper Aircraft Corp. of Lock Haven, Pa., will put on the market in 1953. Produced to sell at something less than $25,000, the Twin-Stinson will feature ample room for four passengers and a spacious cargo compartment. Piper President William T. Piper says; "We feel that this type of airplane will do a great deal to give the businessman even more utility since it will permit him to complete more of his trips after dark and over weather."

* * *

Leroy R. Grumman

Leroy R. Grumman, Chairman of the Board of Grumman Aircraft Engineering Corp., Bethpage, N. Y., added another line to his already distinguished record in "Who's Who" when he received the 1951 Honorary American Fellowship of the Institute of Aeronautical Sciences. Mr. Grumann's 34 years in aviation began when he learned to fly with the Navy in 1918. He was pilot-instructor, test pilot and aircraft engineer with the Navy when he left to join the Loening Aeronautical Corp. In 1929 he founded the company that bears his name and launched the production lines that have turned out the famous Wildcat, the Hellcat, the Tigercat, the Avenger, and the current Panther, first jet airplane to be used in combat by the U.S. Navy.

* * *

Northrop Aircraft of Hawthorne, Calif., comes up with some timely advice to young women who take the Leap Year tradition seriously. Northrop suggests that girls with marriage in mind look around for aircraft engineers, on the grounds that they're in very short supply and hence sure to be a good economic risk for some years to come.

Captain P. V. H. Weems, U. S. Navy, Retired, founder of Weems System of Navigation, author, internationally known consultant on air and sea navigation.

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AVIATION INFORMATION

PILOT AIDS

By

BOB BLATT

Tiedown Markers

BOTH pilots and linemen can save themselves plenty of time and trouble by providing some easy-to-see markers at the tiedown rope anchor locations. These half tire markers eliminate all the usual jockeying-around, lifting and pushing the planes for their correct parking positions. Pilots can taxi right up to their correct parking positions without any trouble.

Discarded tires from lightplanes make ideal markers for this purpose. They are simply cut in half and painted a bright yellow or white to increase their visibility. They are placed round side up and can be easily seen—even in fairly tall grass. No damage is done by taxiing directly over them—either to the plane or tires. This practice also solves the problem of disposing of old and worn-out tires. The picture shows the markers in use at the Lincoln Park, New Jersey, Airport. Ed Gorski, operator of the field, devised this clever idea which has proved the best solution yet for his plane parking problem.

Handy Wrench

HERE is a homemade wrench that can save plane owners and aircraft service operators lots of time in removing generators from Continental engines. Its maker, L. M. Jacobs, Manager of the Jacobs Aircraft Co. at Jackson Mississippi Municipal Airport, claims that he can remove a *Navion* generator in about ten minutes with it. Previously, it took him about 45 minutes to remove the generator, using open-end and box wrenches, with the aid of a screw driver.

Jacobs says that this same wrench will work equally well for generators on all sizes of Continental engines. He made the wrench in his spare time from a Ford transmission "Snap-On" type wrench. He cut the box end down to approximately one-quarter inch in thickness on a grinder in a few minutes. The picture shows Jacobs holding the wrench which has made generator removal a pleasure instead of a chore. All Continental pilot owners and mechanics should have one of these wrenches in their tool kits.

At every airport in America, you'll see young men standing outside the fences, watching the planes come and go; watching the busy hum of the activity of servicing and repair. Are you one who only watches when you could be an important part of these activities?

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★ A FLYING TIP ★

WE were on Nahmint Lake on Vancouver Island—two seaplanes, a Champ and a Stinson.

On the morning of departure the lake was still as glass. The warm air didn't help, either, for the Stinson was loaded with three people, camping and fishing gear and a swell catch of trout.

The Champ got off okay but landed again because the Stinson wouldn't go on the step. Circling to make waves didn't help a bit, so we tried a new one. I had the pilot of the Champ idle his plane ahead of me and I eased up to within 30 feet of his tail. On a signal from me, he opened his throttle and proceeded on a normal take-off. His prop blast over my wings soon had the Stinson on the step. There was just enough artificial wind to help my engine pull the Stinson into a planing attitude. After the usual one-float run she pulled off the glassy lake and we were away.

—Ed Sierer

P.S. Here are a few of the trout.

Ed Sierer and catch

Got any tips you'd like to pass on to other pilots? Contributions should be typewritten, not over 200 words, and accompanied by a stamped-self-addressed envelope. Payment for acceptable material will be made at regular rates. Address, "Tips" Editor, FLYING, 366 Madison Ave., New York 17, N. Y.

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Convair Fighter

Awarding of a contract to Consolidated Vultee Aircraft Corp., San Diego, Calif., for the prototype production of a new high-performance interceptor aircraft has been announced by the Air Force.

Re-entry of Convair into the fighter field makes that company's interest in the four basic aircraft types complete. Convair is already producing B-36 ten-engine bombers and T-29 navigational trainers for the Air Force and has design contracts for an atomic-powered aircraft and the B-60 all-jet swept-wing bomber. For the Navy, Convair is building guided missiles and the R3Y water-based transport.

Thunderjet

(*Continued from page* 35)

with Napalm rather than extra fuel.

All of this armament is aimed with a Sperry A-1C combination sight which automatically solves the fire control and ballistics problem for guns, bombs and rockets. Hits have been scored on Migs over Korea by this sight at more than a mile and a half.

No mid-air refueling apparatus is shown in the drawing of the "E" model of the *Thunderjet* but would be present if the "G" model were displayed. It may be noted that the F-84 can be refueled aloft in less than three minutes.

In general dimensions the F-84E is 38 ft. 5 in. long, has a wing span of 36 ft. 4 in. and can be loaded up to a gross weight of 18,000 pounds. In speed the plane is in the 600 plus mph class.

In addition to its service in Korea, the *Thunderjet* is the tactical backbone of "General Ike's Air Force." France, Belgium, the Netherlands, Italy, Norway, Denmark, and, since their entry into NATO, Greece and Turkey are equipped with *Thunderjets*. END

Cross Wind

(*Continued from page* 19)

wheels also reduced the landing jolt.

Geisse points to incidental advantages of the gear. A castering wheel makes it impossible to roll the plane over in a turn, obviating the need for devices now being used to avoid too sharp turns. Thus the gear permits a narrower wheel tread.

In original design incorporating the gear, he believes it will be possible to save weight on the landing gear, since the castering effect virtually eliminates the inward load on the struts.

Need for just a handful of metal for the gears—they add only eight pounds to the empty weight of the small plane—makes manufacture, even in these times, relatively simple. Finding someone not too busy to undertake it, however, is keeping Geisse busy. Meanwhile, interest—and actual orders—pile up. Geisse expects Cessna owners will be early customers, since only a wrench is needed for installation. Later, units will be provided for other planes, on most of which the installation will require cutting the axles from the struts.

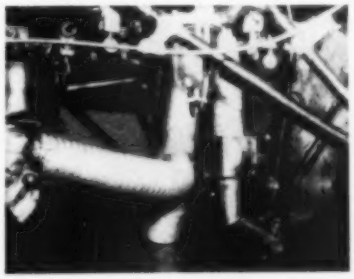
Geisse, who received the Department of Commerce gold medal last year for his contributions to the development of aviation while in government service, has never received praise from the aviation industry. He has fought valiantly for a better plane with appeal to a wider segment of the population, contending that the vicious circle that keeps airplanes rare can be attacked only by making the vehicle more useful to more people. Certainly his crosswind gear increases the number of places on which the airplane can be landed safely, and frees it still more from the effects of the wind and weather.

Like many another outspoken leader in aviation, he sometimes sees many of his ideas boil up to the top and become accepted. It would be simple, poetic justice for his brainchild, the crosswind gear, actually born as far back as 1934, to find a welcome throughout the aviation industry and the flying fraternity. END

Glass Bowl Safety

HERE IS one way to reduce the possibility of gascolator glass bowls falling apart in flight in the event they become cracked. By simply extending the usual safety wire for the gascolator up to the top and completely encircling the bowl, securely anchoring it at each side on the bowl supports, the bowl is thus reinforced. In the event that it becomes cracked due to vibration or expansion, it would more than likely hold together and hold the gasoline until a landing was made.

These glass bowls on gascolators of personal planes are especially subject to cracking where the bowl retaining nut is excessively tightened. Sometimes there is a flaw in the glass. At every line check the bowl should be carefully examined for cracks. The above safety wire installation can easily be made by any pilot.



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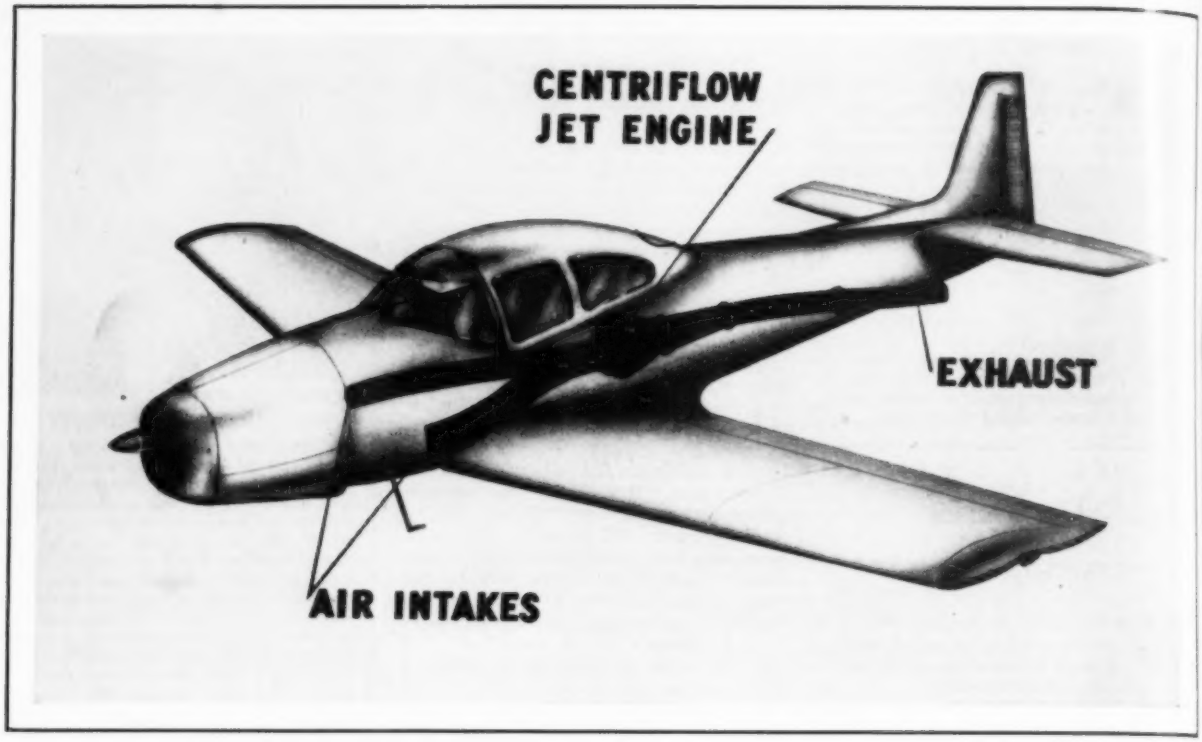

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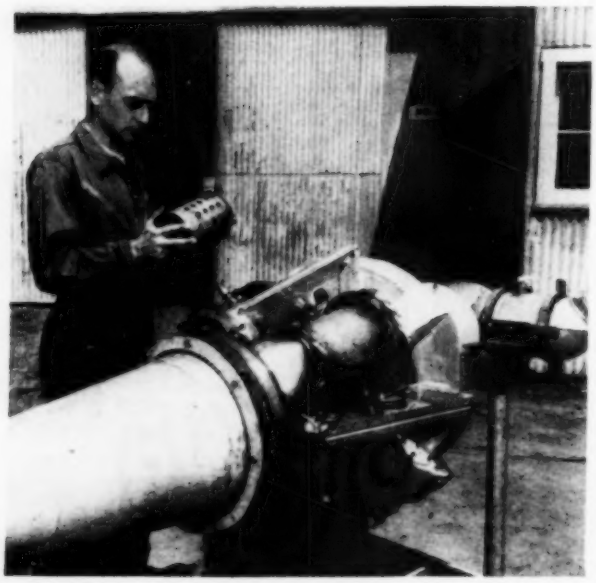

Two pounds of thrust is calculated for each pound of weight in the Centriflow.

WHEN turbine power for aircraft was first introduced the opinion prevailed that its use would be restricted to heavy units. Intervening years have changed that opinion and extensive development of light "jet" engines has taken place both here and abroad.

Presently the consumer market of personal aircraft is hoping for an engine of dependability and lightness to suit both the utility and pocketbook of the private flyer.

Pictured here is Joseph A. Bova, engineering student of the Northrup Aeronautical Institute, as he displays the inner burner of the Centriflow, "baby jet," a project of the school.

Weighing 172 lbs., with a calculated thrust of 340 pounds, the Centriflow will be installed in a Ryan Navion when ground tests are completed.

The unique design of the Centriflow, featuring four combustion chambers installed parallel to the engine axis permits a powerful, compact and light-weight structure.

Powerplant instructor, William Tietjen of Northrup, says the Centriflow is an advance over the two previous models developed by his students. He estimates that such an engine as the Centriflow could power small planes in the 300 mph class . . . depending on the structural stability of the plane.

No immediate plans for production or sale of the Centriflow have been made.

By BILL RENSHAW

LATE R.F.D. AIR MAIL NOTES

Without ever getting out of a slightly enlarged pattern, 67 Flying Farmers, while conducting a recent Kiddie Airlift in Indiana, flew mileage (not knots) equal to one-fourth the distance around the world.

Globe girdling Peter Mack, Illinois Congressman, will be featured speaker at a midwestern Flying Farmer Clinic, to be held at the University of Illinois, April 14. The Congressman, a member of the Flying Farmer Organization, will discuss his recent good-will trip, with particular emphasis on his flight, which was made in a Beechcraft Bonanza.

An Indiana Flying Farmer remitting $5.00 to a voluntary state-wide Airmarking Program said, "Here is an extra five—do something about the weather too."

* * *

AS THE TWIG IS BENT

Flying Farmers put great stock in that most famous Solomon utterance, "as the twig is bent so the tree inclineth." They believe that the parable of the twig is applicable to aviation, and particularly so of their own children, many of whom get their first flight before they can even crawl.

John K. Phifer of Wheatland, Wyoming, whose three sons are all safe, sane pilots, predicts that a very high percentage of FF's children will want to learn to fly. Using his own family as an example, John says, "At about 17 years of age my boys, one at a time, asked to learn to fly. Now 19, 20 and 23 they are enthusiastic private pilots."

All of which lends emphasis to our theory that we've got to get to 'em younger if the light airplane is to ever really come to its own.

To go back to Solomon for a closing statement we would say, "Bring a child up in the way he should go and when he is old he will not depart from it." And that goes for flying as well as morals.

* * *

BUSINESS BEFORE PLEASURE

Remember when aircraft pilots were regarded as thrill seekers and daredevils? In those days it was believed that pilots were "touched in the head." It is doubtful if that ever was the case, and it certainly isn't true among present day Flying Farmers.

Response from 100 Flying Farmers queried recently indicates that thrills had nothing whatever to do with their learning to fly.

Most of the FF's bought aviation much as they bought combines, corn pickers and other labor savers.

John Wiley of Prosser, Washington, said, "I bought an airplane to expedite my farming operations."

Nine out of every ten Flying Farmers said they learned to fly because they believed they could use an airplane to an advantage in their agricultural pursuits. In more than half of these cases, however, the desire to fly was kindled in childhood.

Flying scenes in the old-time movies caused "Reg" Wood of New Milford, Pennsylvania, to sprout wings when the Flying Farmer movement was born many years later. Another FF said that reading the "National Geographic" more than 20 years ago was responsible for his resolve to fly someday. Lindbergh's flight to Europe also had a very wholesome effect on several boys who have since become Flying Farmers. Six of the 100 contacted, like Forrest Hedgecock of Hatch, New Mexico, mentioned the "lone eagle's" flight as something that stayed with them until they were eventually able to fly almost a generation later.

* * *

MATTER OF ECONOMICS

Any analysis of the ills of private flying will not be complete unless it includes a study of the "economic climate," according to Sam Freeman, President of New Jersey FF's. Sam says that inflation pressures and increasing taxes are forcing many pilots to give up their airplanes in his area.

Also answering our query as to why "little aviation" is ill are Roger and Esther Neff of Delphi, Indiana. These young aviation enthusiasts put it in a few words, "After Uncle Sam gets through with us there just isn't enough left."

Getting Uncle Sam to recognize the Flying Farmers' airplane as just another farm tool, instead of a luxury, would be a very encouraging factor, and the National Flying Farmers' Association is working to that end. At present there is little uniformity among collectors of Internal Revenue. Some allow reasonable deductions for airplanes used on the farm, while others allow little or nothing.

The case for Flying Farmers is weakened by the fact that there still is far too little utility in today's light plane. Seems like any analysis of the aches and pains of "little aviation" eventually winds up in the same place—the laps of the manufacturers. "When oh when," Flying Farmers ask, "will someone build a light airplane that will have utility in it five or six days out of every week?" Among Flying Farmers there is firm belief that it can be done.

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3) We think you will identify this one easily but doubt if you have ever seen the city from just this angle. The Golden Gate Bridge is not in the picture.

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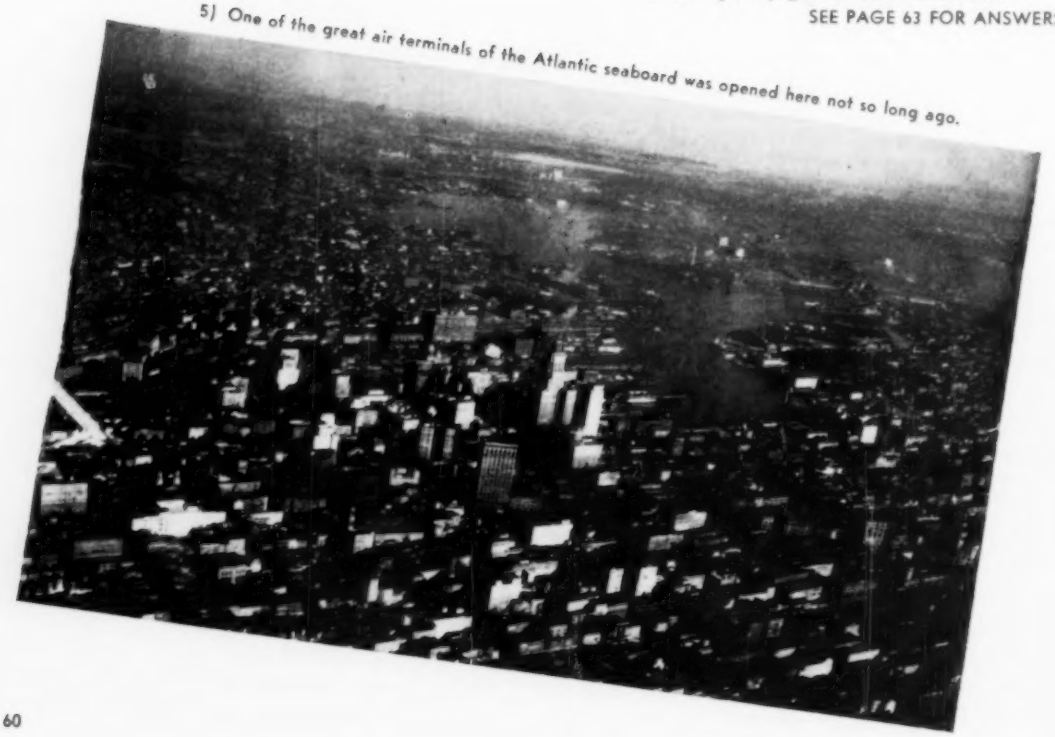
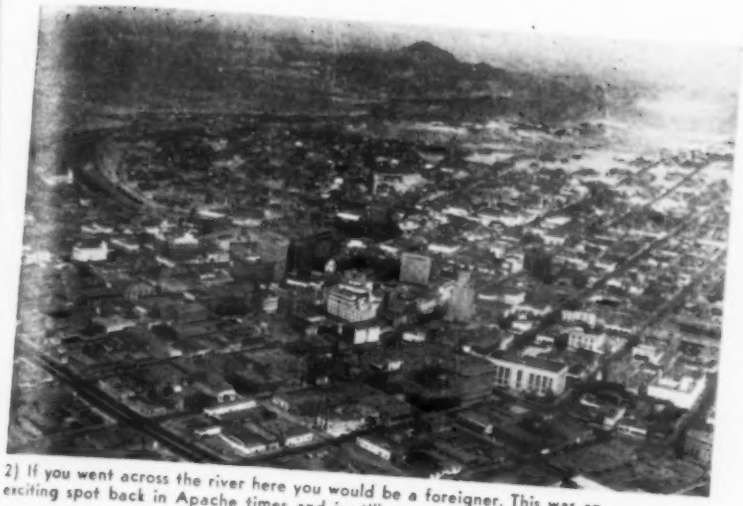
SEE PAGE 63 FOR ANSWERS

5) One of the great air terminals of the Atlantic seaboard was opened here not so long ago.

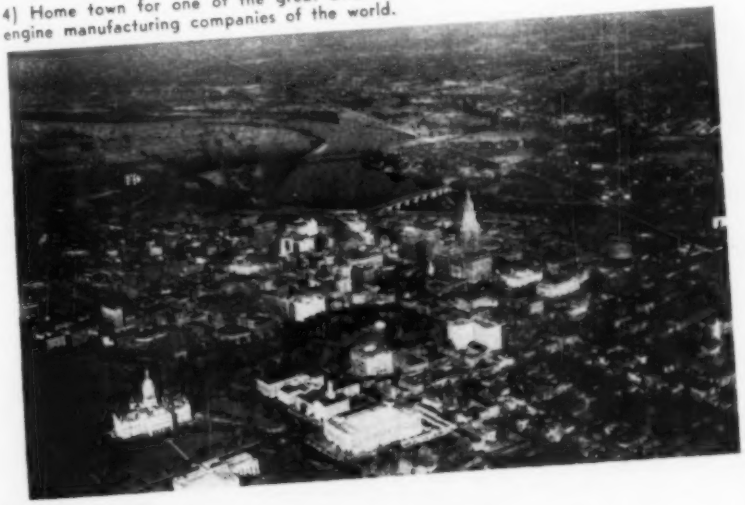




2) If you went across the river here you would be a foreigner. This was an exciting spot back in Apache times and is still an exciting place to visit.

1) Whether the "slow train" ever crossed one of these four bridges, we do not know. We do know that this little city at the eastern rises of the Ouachita Mountains is a lovely and hospitable place for an airman to stop.

4) Home town for one of the great aviation engine manufacturing companies of the world.



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Arctic Sentinel

(Continued from page 17)

down through some breaks in the clouds. He could see that he was well over the ice cap. Flying west, he picked up the coast but was unable to tell whether he was north or south of the field. With gas running low, he kept up a constant radio call for directions.

Bluie West Eight could hear the call and was responding with a heading but the transmission was lost. Without delay another plane took off from the field, climbed above the mountains and guided the lost plane to safety.

Another time, a plane elected to leave B.W. 8 for Thule shortly before a four-hour period of twilight. The weather wasn't too bad and there was gas enough aboard for a round trip if that became necessary. As usual, every precaution was taken to establish a basic heading by lining up on the runway, a known direction, and setting all gyro compasses on this heading. With each gyro precessing a known number of degrees each hour, take-off was approved.

The elements were uncooperative from the start. Heavy clouds developed as the plane sailed along over the edge of the ice cap and ice began to build up on the wings and tail. By sighting with radar on the coast through the clouds the navigator determined that the wind, forecast out of the north, had shifted to west and was much stronger than had been anticipated.

The clouds were solid overhead so a fix was out of the question. About this time the radio announced that B.W. 8 was closed by weather. At the estimated halfway point radio contact with B.W. 8 was lost and Thule was too remote for a clear signal.

To conserve gas, the pilot decided to cut across the ocean rather than take the longer route around the coast. By now the wind had shifted to northeast and was coming off the ice cap with gale velocity. The plane remained on the new heading until the estimated time of arrival, but still there was no signal from Thule.

A sudden break in the clouds showed that the plane was still over the ocean, either north or south of the destination. The pilot headed back east to pick up the coast. Soon a weak signal from Thule and a last-minute sunshot confirmed his judgment. Another two hours on the former course and the plane would have been over the North Pole.

As in any gigantic flying operation there are bound to be a few close calls. It's then that the resourcefulness and the experience of the crews are priceless assets.

The present system of rotation for officers and men doing a tour at Thule calls for a six-month period before application for transfer may be made. This will be extended when the base is finished by the end of 1952. The facilities for sports and amusements will then be the equal of those at Stateside bases. Basketball, tennis and a full-size swimming pool will be available and first-run movies will be on view in the base theater.

In the meantime, the airlift to Thule goes on. Arctic hazards have been mastered, and the northernmost of Uncle Sam's operations has earned the favorite military designation, "routine." END

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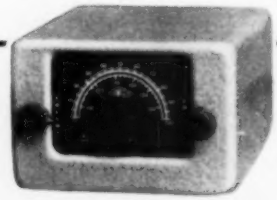

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☆ FLAT SPINS ☆

A Rhode Island Air Force Reserve training group asked reservists: "What type of Reserve activity do you prefer?" To which Sgt. W. H. Taylor of Providence replied: "Rest and recreation in the U.S.A." P.S.—Taylor's reply was postmarked Korea, where he's now on duty.

Here's a new explanation for the relatively mild New England winters of recent years. A Haverhill, Mass., resident theorizes: "I don't think we'll ever have another hard winter so long as there are airplanes up there disturbing the stratosphere. They don't give the clouds a chance to form."

Now it develops that you CAN land a plane on a postage stamp, more or less. At Butte, Mont., after a faulty take-off, Dirk Duykers escaped serious injury by landing on the roof of an airport hangar. Roof dimensions—10 x 100 feet.

Back in 1870, some few years before the Wright Brothers made history, 12-year-old Cora Carpenter of Rockford, Ill., wrote an essay predicting that men would one day fly through the air in machines. Now she knows she was right. A short time ago, when she was nearly 94, Miss Carpenter went for her first plane ride.

The air age is a boon to certain aspects of higher education. Bobby Grillin, football and basketball star at Brandeis University, recently played a home basketball game at Waltham, Mass., boarded a plane next day to play with the football team in Florida, then flew back north for another basketball contest. Naturally, he did his studying en route.

Agriculture flying has been classified by the Labor Department with the occupations critical to defense, and pilots so engaged may receive consideration for deferment by draft boards when the question of recall to military service comes up. Dusting, seeding, weeding and defoliating of crops and forests, and pest and fire control from the air are all classed as essential to the nation's welfare.

Four hefty passengers, each with one trunk and no baggage, arrived by air in Amsterdam, Holland, from New York. They were a quartet of elephants.

"The cheapest air trip in the world, and the shortest." That's how the management describes the helicopter service between London Airport and Northolt, on the other side of town. The fare, $1.40, is cheaper than the taxi rate for the same trip on the surface.

It may have seemed a "fur piece" back in 1903, but the 120 feet flown by the Wright Brothers at Kitty Hawk is slightly more than half the distance between one end of the wing of a B-36 and the other.

When Ted Williams, the Boston outfielder was learning how to fly as an aviation cadet with the Marines in World War II, his instructor was Bob Kennedy, outfielder for the Cleveland Indians.

Planes with their wings full of holes may be flying at the speed of sound soon. The Society of British Aircraft Constructors are experimenting with porous wings on the theory that when a plane goes very fast the air gets in the way of the wing. So why not suck some of the excess air into the wing? It's that simple, IF it works.

—*Harold Helfer*

Rescue is for Who Needs Rescue

Wounded soldiers on battlefields are not the only people to whom the helicopter looks like an angel.

When this Sikorski found her eighty miles at sea, Miss Nemesia Sanclemente had been hanging onto a hatch cover for three days. A citizen of Panama, Miss Sanclemente and a Mr. Marcos Medina were sole survivors of a passenger launch which went down with 25 other persons.

Rescue of the survivors climaxed a search off the Pacific Coast of Panama by Flight "B" of the 1st Air Sea Rescue Squadron. While Air Force Captain, John F. Miller, of Texarkana, Texas, hovered his 'copter just above the wave tops Tech. Sgt. Clay H. Danner of Asheville, N. C., got his gear around the disaster victims and hoisted them aboard.

So carefully planned had been the search and so successful the technique of rescue that both Captain Miller and Sergeant Danner were recommended for the Soldier's Medal.

It is of record that in many areas such as Alaska, Panama, Greenland, and elsewhere around the borders of the United States, the majority of rescues, although carried out by military organizations, involve civilian personnel. This is something we who are scarcely ever in need of such service tend to forget. It is a civilian dividend of national defense.

ANSWERS TO "WHERE AM I?" (PAGES 60-61)

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Any time Roy Knabenshue, M. J. Montee, and Walter Brookins get together is time to take a picture. Knabenshue was the Army's first balloonist; Montee is the nation's oldest licensed pilot; and Brookins was the Wright Brothers first student pilot. The three met at A.B.C.'s Hollywood Television Center to unveil the Ralston Rocket.

I Got Me a Hobby

(Continued from page 44)

rudder dug in and over I went again. The sound of tearing fabric and splintering wood filled my ears. I finally landed right side up—end of the line. I unfastened my safety belt and shoulder straps and climbed out.

I wear glasses and wondered what had become of them. After searching, I discovered they were on my forehead in my goggles.

Now I turned to look at my plane. The upper right wing was kaput, the strut was broken, rudder and fin crushed beyond repair. Stabilizer and elevator were both gone, landing gear bent, and my met-l-prop, which I had put on before taking off, was twisted. As I put my hand up to my nose, I found it too was twisted. The boys from the airport came and we took the midget back to the hangar. Then I went to the doctor and had my nose put back.

A few days later the C.A.A. inspector found a small piece of metal in the gas line. As long as the plane sat on the ground or was in level flight, it could get enough gas but when I took off and put it into a steep climb, the gravity pressure would drop and not enough gas could get by this piece of metal. The engine would take all gas out of the line and stop. We had made the gas tank and it had been washed many times but this piece of metal lodged in it somewhere and then came loose and got into the line.

I am spending my spare time now rebuilding the *Knight*. Somehow it seemed worth while creating something in the first plane and when you create something of your own, you get a kind of pride in it.

END

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170's: 17 available. 1948, #408SVF, has 225 hours. Metal propeller, Gyro, Loop. Exceptional, $3700. Also, 1950 all metal, #979SAF, with 246 hours. Metal propeller, Gyros, Omni-range, Bargain, $6000. Apply, Powers & George, Aircraft Brokers, 475 5th Ave., New York, N. Y. "Airplanes Everywhere."

TWINS: 16 available. #5462TF has 297 hours since recovered and engines and propellers major overhauled, outside baggage door, Gyros, Flares, ADF, Clean, $2750. Inquire, Powers & George, Aircraft Brokers, 475 5th Ave., New York, N. Y. "Airplanes Everywhere."